N00102.AR.002897
NSY PORTSMOUTH
5090.3a

FINAL RECORD OF DECISION FOR OPERABLE UNIT 4 (OU 4) SITE 5 AND OFFSHORE AREAS POTENTIALLY IMPACTED BY PNS ONSHORE INSTALLATION RESTORATION PROGRAM SITES NSY PORTSMOUTH ME
8/1/2013
NAVFAC MID ATLANTIC

RECORD OF DECISION

OPERABLE UNIT 4 – SITE 5
AND OFFSHORE AREAS
POTENTIALLY IMPACTED BY
PNS ONSHORE IR PROGRAM SITES

PORTSMOUTH NAVAL SHIPYARD
KITTERY MAINE

CONTRACT NUMBER 62470-08-D-1001
CONTRACT TASK ORDER WE13

August 2013

TABLE OF CONTENTS

TABLES

NUMBER

FIGURES

NUMBER

APPENDICES

Acronyms

µg/dL	Microgram per deciliter
µg/kg	Microgram per kilogram
AOC	Area of concern
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
bss	Below sediment surface
BMP	Best management practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	Centimeter
COC	Chemical of concern
COPC	Chemical of potential concern
CSF	Cancer slope factor
cy	Cubic yard
DRMO	Defense Reutilization and Marketing Office
EERA	Estuarine Ecological Risk Assessment
EPC	Exposure point concentration
ER-M	Effects range median
ER, N	Environmental Restoration, Navy
FCS	Final Confirmation Study
FFA	Federal Facility Agreement
FS	Feasibility Study
HHRA	Human health risk assessment
HI	Hazard index
HMW	High molecular weight
HQ	Hazard quotient
IAS	Initial Assessment Study
IEUBK	Integrated Exposure Uptake Biokinetic
IR	Installation Restoration
IRG	Interim Remedial Goal
LUC	Land use control
MEDEP	Maine Department of Environmental Protection
mg/kg	Milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration

NPW	Net present worth
O&M	Operation and maintenance
OU	Operable Unit
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PNS	Portsmouth Naval Shipyard
PPE	Personal protective equipment
PRG	Preliminary remediation goal
RAB	Restoration Advisory Board
RAO	Remedial action objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial design
RfD	Reference dose
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
TSD	Treatment, storage, and disposal
UCL	Upper confidence limit
USC	United States Code
USEPA	United States Environmental Protection Agency

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

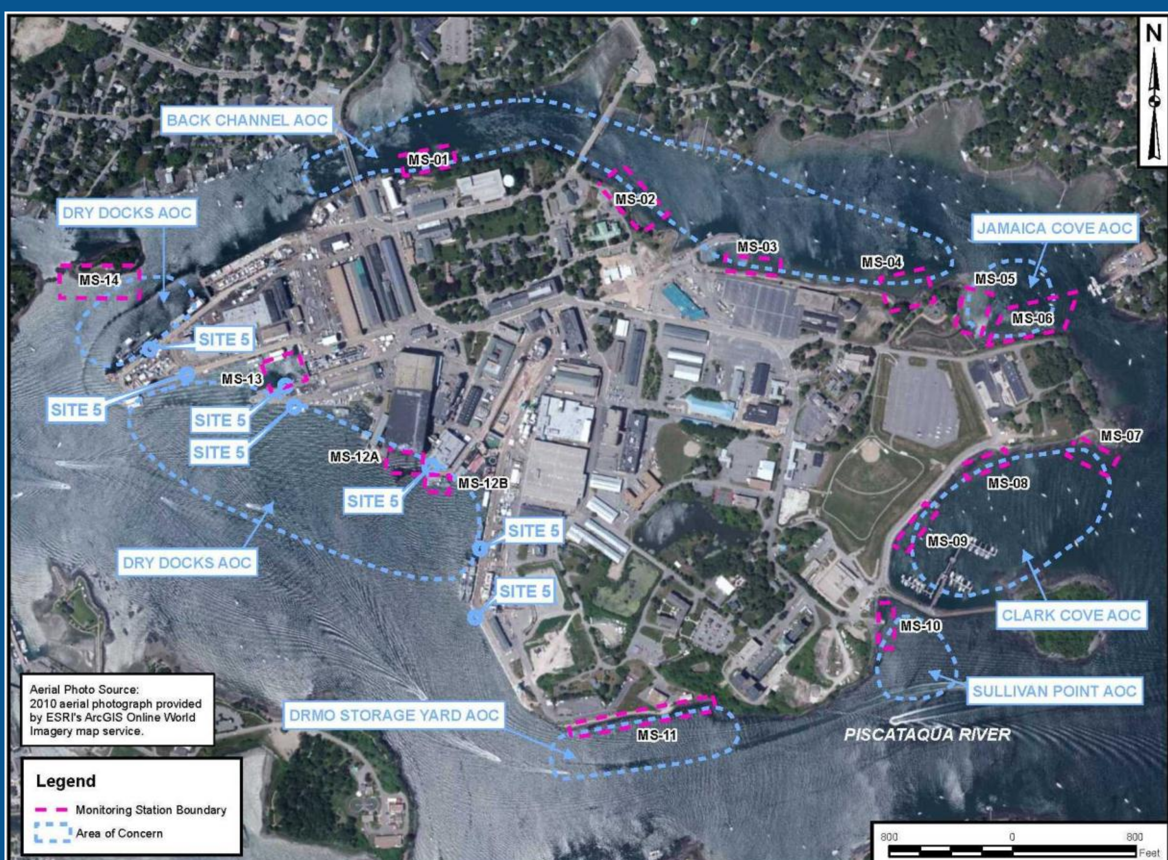
Portsmouth Naval Shipyard (PNS)
United States Environmental Protection Agency (USEPA) ID No. ME7170022019
Operable Unit (OU) 4 – Site 5 (Former Industrial Waste Outfalls) and Offshore Areas Potentially Impacted by PNS Onshore Installation Restoration (IR) Program Sites.
Kittery, Maine

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Selected Remedies for sediment contamination at OU4. These remedies were chosen by the Navy and USEPA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC) §9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300 et seq., as amended. This decision is based on information contained in the Administrative Record for the site. The Maine Department of Environmental Protection (MEDEP) concurs with the Selected Remedies (see Appendix A). Upon implementation of the final remedies for OU4, interim offshore monitoring will be discontinued.

OU4 Site 5 and the six areas of concern (AOCs) identified for the PNS offshore are shown on Figure 1-1.

FIGURE 1-1. SITE LOCATION MAP



1.3 ASSESSMENT OF SITE

The response actions selected in this ROD are necessary to protect the environment from actual or threatened releases of pollutants or contaminants from the offshore areas associated with OU4 that may present an imminent and substantial endangerment to the offshore environment. A CERCLA action is required because concentrations of copper, lead, and select polycyclic aromatic hydrocarbons (PAHs) [acenaphthylene, anthracene, fluorene, and high molecular weight (HMW) PAHs] in sediment pose potential unacceptable current and future risk to benthic invertebrates. OU4 includes Site 5 – the Former Industrial Waste Outfalls, and six AOCs that were potentially impacted by past releases from onshore IR Program sites. IR Program contaminant sources have been eliminated or are being controlled through various onshore actions.

The six AOCs are Clark Cove, Sullivan Point, Defense Reutilization and Marketing Office (DRMO) Storage Yard, Dry Docks, Back Channel, and Jamaica Cove. Past contamination from Site 5 is addressed as part of the Dry Dock AOC, and due to the offshore nature of the contamination at the six AOCs, these areas have been evaluated using 14 separate monitoring stations. These monitoring stations (labeled MS-01 to MS-14) provide coverage of the offshore AOCs, and remedial alternatives for OU4 were developed and evaluated for individual monitoring stations or groups of nearby monitoring stations. The locations of the monitoring stations in relation to the AOCs are shown on Figure 1 -1.

Chemicals concentrations in sediment are greater than acceptable levels for ecological exposure at MS-01 (PAHs), MS-03 (copper), MS-04 (copper and PAHs), and MS-12 (lead and PAHs). Therefore, further action is required for these monitoring stations. Based on the distribution of chemical concentrations and differences in physical settings, MS-12 was divided into MS-12A (lead and PAHs) and MS-12B (lead). Response actions are provided in this ROD for these five areas.

There are no unacceptable risks at MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14; therefore, further action is not required at these 10 monitoring stations.

1.4 DESCRIPTION OF SELECTED REMEDIES

The major components of the Selected Remedy for MS-01, MS-03, MS-04, and MS-12 (A and B) include the following:

- Dredging of contaminated sediment at each monitoring station.
- Dewatering of sediment dredged from each monitoring station.
- Disposal of dredged sediment in an off-yard landfill.

The Selected Remedies for MS-01, MS-03, MS-04, and MS-12 (A and B) remove contaminated sediment to reduce chemical concentrations to acceptable levels. Land use controls (LUCs), operation and maintenance (O&M), monitoring, inspection, and five-year reviews will not be required after removal of contaminated sediment in these five areas. The Selected Remedies for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14 are No Further Action. Upon implementation of the final remedies for OU4, interim offshore monitoring will be discontinued.

The Selected Remedies for OU4 are expected to achieve substantial long-term risk reduction and allow for unlimited use and unrestricted exposure for the offshore areas. This ROD documents the final remedial decisions for OU4 and does not include or affect any other sites at the facility. Implementation of this decision is consistent with current uses and the overall cleanup strategy for PNS to clean up sites to support Shipyard operations.

The remedies for the monitoring stations address Site 5 and the AOCs as follows.

AOC/Site	Monitoring Station	Remedy
Dry Dock/Site 5	MS-12 (A and B)	Sediment Removal
	MS-13, MS-14	No Further Action
Back Channel	MS-01	Sediment Removal
	MS-02	No Further Action
	MS-03, MS-04	Sediment Removal
Jamaica Cove	MS-05, MS-06	No Further Action
Clark Cove	MS-07, MS-08, MS-09	No Further Action
Sullivan Point	MS-10	No Further Action
DRMO Storage Yard	MS-11	No Further Action

1.5 STATUTORY DETERMINATIONS

The Selected Remedies are protective of human health and the environment, comply with federal and state requirements that are applicable or relevant and appropriate to the remedial actions, are cost-effective, and utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The Selected Remedies do not satisfy the statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, and contaminants. Based on the types, depths, and patterns of contamination across OU4, the Navy concluded that it was impracticable to treat the chemicals of concern (COCs) in a cost-effective manner.

Five-year site reviews will not be required for OU4 because contamination will not remain in excess of levels that allow for unlimited use and unrestricted exposure.

1.6 ROD DATA CERTIFICATION CHECKLIST

The locations in Section 2.0, Decision Summary, of the information required to be included in the ROD are summarized in Table 1-1. Additional information can be found in the Administrative Record file for PNS.

TABLE 1-1. ROD DATA CERTIFICATION CHECKLIST

DATA	LOCATION IN ROD
COCs and their respective concentrations	Sections 2.5 and 2.7
Baseline risk represented by the COCs	Section 2.7
Cleanup levels established for COCs and the basis for these levels	Section 2.8
How source materials constituting principal threats are addressed	Section 2.11
Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the risk assessment	Section 2.6
Potential land and groundwater uses that will be available at the site as a result of the Selected Remedies	Section 2.12.3
Estimated capital, operating and maintenance, and total net present worth (NPW) costs; discount rate; and number of years over which the remedy costs are projected	Appendix F
Key factors that led to the selection of the remedies	Section 2.12.1

If previously unknown contamination posing an unacceptable risk to human health or the environment is discovered after execution of this ROD and is shown to be a result of Navy activities, the Navy will undertake the necessary actions to ensure continued protection of human health and the environment.

1.7 AUTHORIZING SIGNATURES

The signatures provided below and on the following page validate the selection by the Navy and USEPA of the final remedies for contamination at OU4. MEDEP concurs with the Selected Remedies.

8/7/13

W. C. Greene
Captain, United States Navy
Commanding Officer
Portsmouth Naval Shipyard

Date

James T. Owens, III

8/15/13

James T. Owens, III, Director
Office of Site Remediation and Restoration
USEPA Region 1

Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

PNS, USEPA ID number ME7170022019, is a military facility with restricted access on an island located in the Piscataqua River, referred to on National Oceanic and Atmospheric Administration (NOAA) nautical charts as Seavey Island, with the eastern tip given the name Jamaica Island. Clark's Island is to the east attached by a rock causeway to Seavey Island. The Piscataqua River is a tidal estuary that forms the southern boundary between Maine and New Hampshire. PNS is located in Kittery, Maine, north of Portsmouth, New Hampshire, at the mouth of the Great Bay Estuary (commonly referred to as Portsmouth Harbor). The shipbuilding history of PNS dates back to the 1800s, and the facility has been engaged in the construction, conversion, overhaul, and repair of submarines for the Navy since 1917.

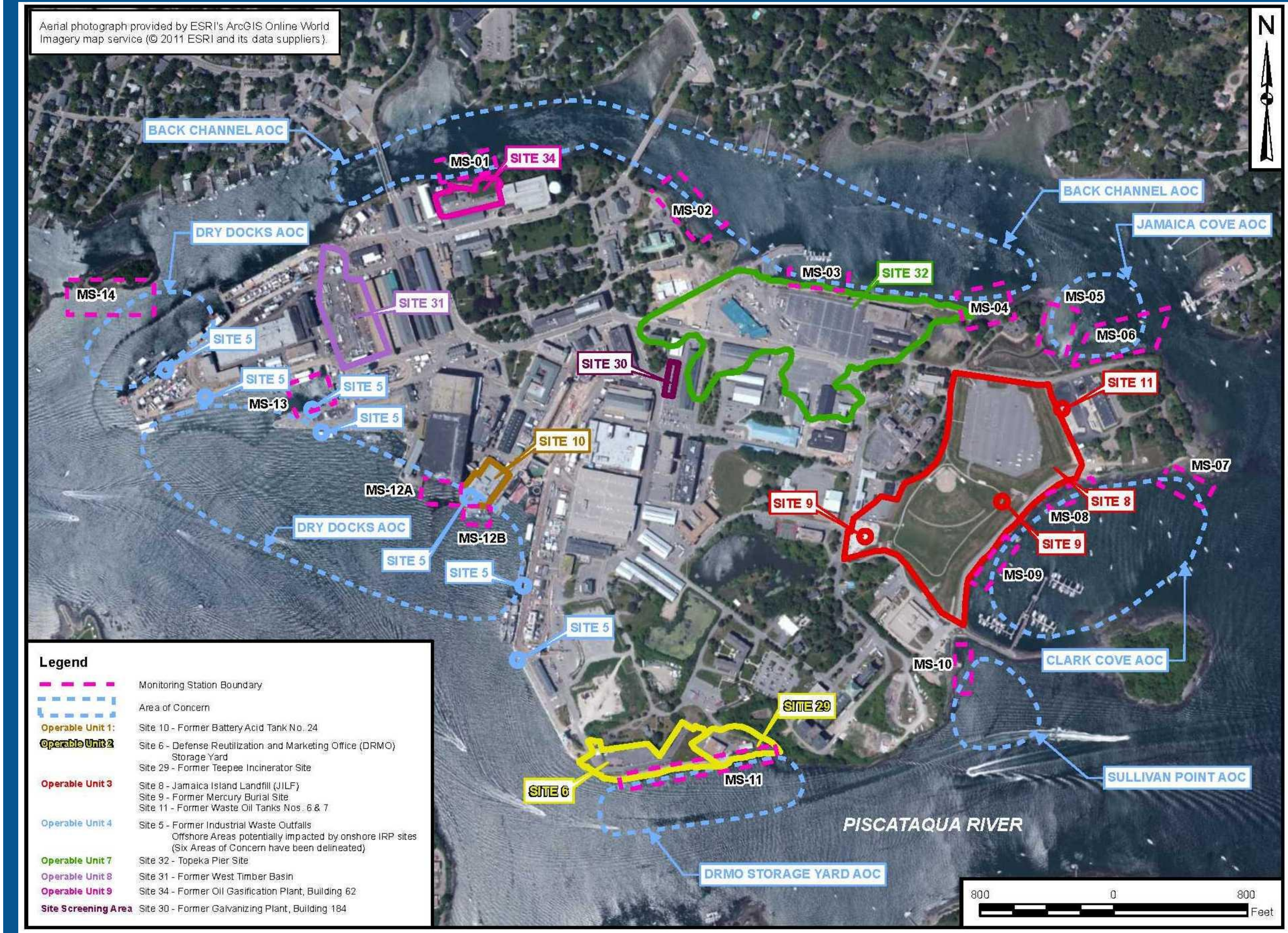
OU4 is divided into six AOCs, identified in the Estuarine Ecological Risk Assessment (EERA) Report as nearshore habitats adjacent to PNS that may have been affected by onshore IR Program sites. A conceptual model developed as part of the EERA was used to identify AOCs, which include Clark Cove, Sullivan Point, DRMO Storage Yard, Dry Docks, Back Channel, and Jamaica Cove. In 1999, an interim remedy was selected to provide sediment monitoring before a final remedy was selected for OU4. As part of the Interim Offshore Monitoring Program, 14 monitoring stations were identified to provide coverage of the offshore AOCs for interim monitoring purposes. The AOC, monitoring station, and IR Program site locations are shown on Figure 2-1.

Two IR Program sites, Site 5 - Former Industrial Waste Outfalls and Site 26 - Portable Oil/Water Tanks, were considered sites that had offshore impacts but no onshore impacts. In August 2001, a Decision Document was signed indicating that No Further Action under CERCLA is necessary for Site 26; therefore, Site 26 is no longer included in OU4. Site 5 is located within the Dry Docks AOC, and any offshore impacts that the site may have had are being addressed as part of the Dry Dock AOC. Site 5 consisted of numerous discharge points along the Piscataqua River at the western end of PNS in the dry dock area. The outfalls were used from approximately 1945 to 1975 to discharge liquid industrial wastes (primarily from acidic, alkaline, and metal-plating rinse baths) to the offshore before the sanitary and storm sewer systems were separated and offshore discharge of industrial wastes was discontinued. The wastewaters may have contained heavy metals (mercury, lead, cadmium, chromium, copper, and zinc), oils and grease, and polychlorinated biphenyls (PCBs). Lead sediment from decommissioned batteries was also reportedly included in the discharge to the river before 1975 (in the MS-12 area). In 1978, dredging was conducted offshore in the vicinity of the outfalls (in the berth areas by the dry docks), and maintenance dredging is conducted periodically in the berth areas. Site 5 and the IR Program sites that potentially affected the offshore and the associated monitoring stations and AOCs are discussed herein.

MS-01, MS-02, MS-03, and MS-04 are located in the Back Channel AOC. MS-01 is located in the western portion of the AOC, offshore of Site 34 (OU9) and adjacent to the bridge leading to Gate No. 1. Past disposal of ash at Site 34 is the likely source of elevated PAHs at MS-01. Removal of the ash as part of a 2007 removal action at Site 34 eliminated the site-related source of contamination to this station. MS-02 is located between Topeka Pier and the bridge from Gate No. 2. There are no known IR Program sites immediately onshore of MS-02. MS-03 and MS-04 are located in the eastern portion of the AOC, offshore of Site 32 (OU7). Foundry slag associated with fill material at Site 32 has been identified in the intertidal areas of MS-03 and MS-04 and is likely the source of elevated metals and PAH concentrations at those stations. Removal of surficial debris in the intertidal area and placement of shoreline erosion controls as part of a 2006 removal action at Site 32 eliminated the site-related source of contamination to these monitoring stations.

MS-05 and MS-06 are located in the offshore area of OU3 in Jamaica Cove and are adjacent to the wetland constructed as part of the remedy for OU3. As part of the remedy for OU3, contaminated soil adjacent to Jamaica Cove was excavated, and wetlands were constructed in the excavated area. Although there is no longer contaminated soil adjacent to Jamaica Cove, the excavation of contaminated soil resulted in a temporary increase in chemical concentrations in sediment offshore of Jamaica Cove.

FIGURE 2-1. SITE FEATURES



MS-07, MS-08, and MS-09 are located in the Clark Cove AOC. MS-07 is located in a recreational area of the AOC, and is not immediately offshore of OU3. There are no known IR Program sites immediately onshore of MS-07. MS-08 and MS-09 are located immediately offshore of OU3 in the AOC. The intertidal area near MS-08 was excavated as part of OU3 remedial activities in 2004, and the excavated area was backfilled with clean material. As part of OU3 remedial activities, shoreline erosion controls were installed in the small intertidal areas that existed at MS-09 and then the area was covered with riprap; therefore, there is no longer an intertidal area associated with MS-09.

MS-10 is located at the southeastern corner of PNS, within the Sullivan Point AOC. It is the only monitoring station in this area, and no previous activity is suspected to have led to contamination. There are no known IR Program sites immediately onshore of MS-10.

MS-11 is located within the DRMO Storage Yard AOC. MS-11 is located in the main channel of the Piscataqua River, just offshore of OU2 (Sites 6 and 29). Past DRMO and waste disposal activities led to soil contamination at OU2. Physical movement of contaminated soil, such as snow plowing and erosion of contaminated soil, have resulted in contamination of the offshore area adjacent to OU2 in the past. Current erosion of contaminated soil is not occurring because of controls placed along the shoreline (in 1999 along Site 6 and in 2005, 2006, and 2008 along Site 29).

MS-12, MS-13, and MS-14 are located in the western section of PNS in the Dry Docks AOC. MS-12 is located adjacent to Building 178 and offshore of Sites 5 and 10. One likely source of contamination in the area is the former industrial waste outfalls (Site 5) that reportedly discharged material during previous operations. Other potential Navy and non-Navy sources of contamination exist at MS-12, including potential migration or transport from various boat, barge, and dock-side activities. There are no current IR Program sources of contamination to MS-12. MS-13 is located outside of a dry dock offshore of Sites 5 and 31. MS-14 is located in the westernmost part of the back channel to monitor sediment potentially impacted by Sites 5 and 31.

PNS is an active facility, and environmental investigations and remediation at the facility are funded under the Environmental Restoration, Navy (ER, N) Program. The Navy is the lead agency for CERCLA activities at the facility, and USEPA and MEDEP are support agencies.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Table 2-1 provides brief summaries of previous investigations at OU4. Results of these investigations indicated that copper, lead, nickel, and certain PAHs are present in sediment at several monitoring stations within OU4 at concentrations that exceed cleanup levels.

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION

INVESTIGATION	DATE	ACTIVITIES
Initial Assessment Study (IAS) and Final Confirmation Study (FCS)	1983 to 1986	Assessed and identified potential threats posed by sites to human health and the environment. Industrial waste outfalls were first identified as a site in the IAS. The outfalls were used to discharge industrial wastes into the Piscataqua River from approximately 1945 until 1975. Sediment sampling in the offshore began during the FCS.
Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)	1989 to 1995	Consisted of several stages from October 1989 to February 1992, with results compiled into the RFI Report. USEPA issued the RFI "Approval with Conditions" in March 1993, and the Addendum to the RFI Report was submitted to address the "Approval with Conditions." The RFI Data Gap Report, finalized in 1995, is supplemental to the RFI Report and presents the results of the data gap investigation.
Phase I and Phase II Sampling	1991 to 1993	Offshore sampling was conducted to provide data to support human health and ecological risk assessments for the PNS offshore area. As part of the sampling, six AOCs were identified as nearshore habitats adjacent to PNS that may have been affected by onshore IR Program sites. Samples included sediment, surface water, and tissue.

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION		
INVESTIGATION	DATE	ACTIVITIES
Human Health Risk Assessment (HHRA) and Phase I/Phase II Offshore Data Comparison	1994 to 1998	The 1994 HHRA was based on Phase I data, and the results were updated in 1998 based on Phase II data. Potential exposure points and routes identified for human health included dermal contact with and ingestion of surface water and sediment, and ingestion of biota (lobster, mussels, and flounder) for the PNS offshore area. The results showed that human health risks for exposure to sediment and surface water were acceptable. Concentrations of chemicals in seafood causing potentially unacceptable risks around PNS were generally similar to or less than concentrations in background samples or other coastal waters of Maine.
Interim ROD	1999	Required the Navy to conduct monitoring for the offshore area of PNS in the interim period before the Feasibility Study (FS) was completed for the offshore area and until the final remedy for OU4 is implemented. The Navy determined that interim monitoring was warranted for OU4 to provide current data on the offshore areas to determine whether onshore remedial actions, natural processes, and/or other sources have affected chemical concentrations in OU4.
EERA	2000	An ecological risk assessment for the PNS offshore area was conducted using 1991 to 1993 data. Sediment, surface water, and tissue samples were collected from the offshore area for various analyses/studies. Although the document was finalized after the Interim ROD, the risk results supported selection of the interim remedy. The results of the analyses/studies were used to evaluate ecological risks for the offshore area. The risk determinations associated with surface water and sediment exposure for each AOC and chemicals of potential concern (COPCs) for each AOC were identified. The ecological risks associated with exposure to surface water were determined to be acceptable, and ecological risks associated with exposure to sediment were determined to be potentially unacceptable. Sediment COPCs included metals, PAHs, and PCBs.
Decision Document for Site 26	2001	Documents that No Further Action under CERCLA is required for Site 26 and that Site 26 is no longer included in OU4.
Interim Offshore Monitoring for OU4	1999 to 2011	A monitoring plan was developed and 11 rounds of sampling plus two additional scrutiny investigations were conducted from September 1999 through April 2011. The monitoring plan identified 14 interim offshore monitoring stations located around PNS in the AOC areas and four reference stations (background locations representing non-PNS-impacted areas) in the Great Bay Estuary. As part of the monitoring program, chemical concentrations detected in sediment samples from monitoring stations were compared to concentrations in reference samples to determine whether the contamination was site related or similar to reference concentrations. Preliminary remediation goals (PRGs) were developed using Round 2 data and were used to support identification of Interim Remediation Goals (IRGs) for the monitoring program COCs. IRGs were developed for selected metals and PAHs and were used in the evaluation of data as part of the Interim Offshore Monitoring Program. The data from Rounds 1 through 4 were evaluated in the Baseline Report in 2002, and data from Rounds 1 through 7 were evaluated in the Rounds 1 through 7 Report in 2004. Modifications were made to the monitoring program based on the evaluations in these reports. In addition, investigation related to the nature and extent of contamination at select monitoring stations was recommended and conducted as part of additional scrutiny investigations or Remedial Investigations (RIs) for onshore areas. Two phase of additional scrutiny were conducted and sediment samples were collected as part of the Phase I OU7 RI in 2003 and OU9 RI in 2009. The data from the Phase I Additional Scrutiny Investigation were evaluated in the 2007 Additional Scrutiny Report. Data from Rounds 1 through 10 and the Phase II Additional Scrutiny Investigation were compiled and evaluated in the Rounds 1 through 10 Interim Monitoring Program Report in 2010. Data from Round 11 were evaluated in the Second Five-Year Review Report.

Table 2-1. Previous Investigations and Site Documentation

Investigation	Date	Activities
Interim Offshore Monitoring for OU4 (Continued)	1999 to 2011	The interim offshore monitoring data, including data collected as part of the onshore RIs, were used to determine which monitoring stations had acceptable COC levels to support recommendation for No Further Action. Based on interim offshore monitoring data, COC levels were acceptable at MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-13, and MS-14. Although COC levels were elevated in samples from MS-11, there is a minimal amount of fine-grained sediment present at this station, and the results showed there is not sufficient sediment to cause ecological risk at MS-11. COC levels at MS-01, MS-03, MS-04, and MS-12 required further evaluation.
Public Health Assessment for PNS	2007	The Agency for Toxic Substances and Disease Registry (ATSDR) conducted a Public Health Assessment for PNS and concluded that adults and children consuming fish or shellfish or wading in surface water or sediment offshore of PNS are not likely to experience adverse health effects from the levels of chemicals in those media.
FS	2012	Conducted to develop and evaluate potential cleanup alternatives for OU4.
Proposed Plan	2012	Presented the Navy's Preferred Alternatives to address contamination at OU4, including removal and off-yard disposal of contaminated sediment from MS-01, MS-03, MS-04, MS-12 (A and B), and No Further Action for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14.
PNS Building 178 renovation project	2013	Contaminated sediment within the working area for a PNS renovation project for Building 178 was removed from January to March 2013 resulting in elimination of unacceptable risks in a portion of MS-12A, as discussed further in Appendix G of this ROD.

On May 31, 1994, PNS was placed on the National Priorities List by USEPA pursuant to CERCLA of 1980 and SARA of 1986. The National Priorities List is a list of uncontrolled or abandoned hazardous waste sites identified by USEPA as requiring priority remedial actions. The Navy and USEPA signed the Federal Facility Agreement (FFA) for PNS in 1999 to ensure that environmental impacts associated with past and present activities at PNS are thoroughly investigated and that the appropriate remedial action is pursued to protect human health and the environment. In addition, the FFA establishes a procedural framework and timetable for developing, implementing, and monitoring appropriate responses at PNS, in accordance with CERCLA (and SARA of 1986, Public Law 99-499), 42 USC §9620(e)(1); the NCP, 40 CFR 300; RCRA, 42 USC §6901 et seq., as amended by the Hazardous and Solid Waste Amendment of 1984; Executive Order 12580; and applicable state laws. There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of OU4.

2.3 Community Participation

The Navy has been conducting community relations activities for the IR Program at PNS since the program began. From 1988 to November 1994, Technical Review Committee meetings were held on a regular basis. In 1994, a Restoration Advisory Board (RAB) was established to increase public participation in the IR Program process. Many community relations activities for PNS involve the RAB, which historically met quarterly and recently has met two to four times per year. The RAB provides a forum for discussion and exchange of information on environmental restoration activities among the Navy, regulatory agencies, and the community, and it provides an opportunity for individual community members to review the progress and participate in the decision-making process for various IR Program sites including OU4. Details of the history, objectives, and implementation techniques of community relations activities at PNS can be found in the 2012 Final Community Involvement Plan Update.

The following community relations activities are conducted at PNS as part of the Community Relations Program:

Information Repositories: The Public Library in Portsmouth, New Hampshire, and the Rice Public Library in Kittery, Maine, are the designated Information Repositories for the PNS IR Program. Documents are available on the public website at http://go.usa.gov/vvb.

Key Contact Persons: The Navy has designated information contacts related to PNS. Materials distributed to the public, including any fact sheets and press releases, will indicate these contacts.

Regular Contact with Local Officials: The Navy arranges regular meetings to discuss the status of the IR Program with the RAB.

Press Releases and Public Notices: The Navy issues press releases and public notices as needed to local media sources to announce public meetings and comment periods and the availability of reports and to provide general information updates.

Public Meetings: The Navy conducts informal public meetings to keep residents and town officials informed about cleanup activities at PNS and significant milestones in the IR Program. Meetings are conducted to explain the findings of RIs, to explain the findings of FSs, and to present Proposed Plans, which explain the preferred alternatives for cleaning up individual sites.

Fact Sheets and Information Updates: The Navy develops fact sheets to mail to public officials and other interested individuals and/or to use as handouts at public meetings. Fact sheets are used to explain certain actions or studies, to update readers on revised or new health risks, or to provide general information on the IR Program process.

Responsiveness Summary: The Responsiveness Summary summarizes public concerns and issues raised during the public comment period on the Proposed Plan and documents the Navy's formal responses. The Responsiveness Summary may also summarize community issues raised during the course of the FS.

Announcement of the ROD: The notice of the final ROD will be published by the Navy in a major local newspaper prior to commencement of the selected remedial actions.

Public Comment Periods: Public comment periods allow the public an opportunity to submit oral and written comments on the proposed cleanup options. Citizens have at least 30 days to comment on the Navy's preferred alternatives for cleanup actions as indicated in the Proposed Plan.

Technical Assistance Grant: A Technical Assistance Grant from USEPA can provide up to $50,000 to a community group to hire technical advisors to assist them in interpreting and commenting on site reports and proposed cleanup actions. A Technical Assistance Grant has been awarded to a community organization.

Site Tours: The PNS Public Affairs Office periodically conducts site tours for media representatives, local officials, and others.

A notice of availability of the Proposed Plan for OU4 was published on February 27, 2013, in the Portsmouth Herald and Fosters Daily Democrat. The notice also announced the start of the 30-day public comment period that ended on March 28, 2013. The Proposed Plan and other documents related to these sites are available to the public through the PNS Environmental Restoration Program public website (http://go.usa.gov/vvb). Additionally, an index of available documents is available at the PNS Information Repositories located at the Portsmouth Public Library in Portsmouth, New Hampshire, and Rice Public Library located in Kittery, Maine. A copy of the notices and the Proposed Plan are included in Appendix B of this ROD.

The Proposed Plan notice of availability invited the public to attend a public meeting at the Kittery Town Hall in Kittery, Maine, on March 13, 2013. The public meeting presented the proposed remedies and solicited oral and written comments. At the public meeting, personnel from the Navy, USEPA, and

MEDEP were available to answer questions from the attendees during the informal portion of the meeting. In addition, public comments on the Proposed Plan were formally received and transcribed. The transcript from the public meeting is provided in Appendix C. Responses to the comments received during the public comment period are discussed in the Section 3.0 of this ROD.

2.4 SCOPE AND ROLE OF OPERABLE UNIT

OU4 is part of a comprehensive environmental investigation and cleanup program currently being performed at PNS. In accordance with Section 120(e) of CERCLA, an FFA was entered into between the Navy and USEPA in 1999. Eleven sites are included in the IR Program at PNS. Ten of the sites (excluding Site 30) are included within one of the seven OUs at PNS. Final decisions regarding remedial actions have been made for Sites 8, 9, and 11 in the OU3 ROD (2001), Site 10 in the OU1 ROD (2010), and Sites 6 and 29 in the OU2 ROD (2011). Site 5 is within OU4, the subject of this ROD, along with six AOCs. Proposed Plans were prepared for Sites 32 (OU7 and 34 (OU9) and public comment periods and ROD signatures are anticipated in 2013. One site, Site 31 (OU8), is in the RI/FS stage. A non-time-critical removal action was conducted at Site 30, and a No Further Action Decision Document is being prepared. The Site Management Plan for PNS further details the schedule for the IR Program activities and is updated annually.

OU4 addresses past releases of contamination to the offshore area from Site 5 and onshore IR Program sites. Investigations at OU4 indicate the presence of sediment contamination at MS-01, MS-03, MS-04, and MS-12 (A and B) that poses potential unacceptable risks to the environment. To support the Shipyard renovation project for Building 178, contaminated sediment was removed from the portion of MS-12A within the working area of the renovation project, as discussed further in Appendix G. With the elimination of unacceptable risks, no CERCLA action is required for this portion of MS-12A. Therefore, the area of MS-12A contaminated sediment that will be addressed by the ROD for OU4 does not include the portion within the working area (see Appendix G). There are no unacceptable risks at MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14.

The monitoring stations provide coverage of Site 5 and the offshore AOCs; therefore, the remedies documented in this ROD will achieve the remedial action objective (RAO) for Site 5 and the offshore AOCs as listed in Section 2.8. Implementation of these remedies will allow continued use of the site to support Shipyard operations, which is consistent with the current and reasonably anticipated future industrial use of these sites and the overall cleanup strategy for PNS of restoring sites to support Shipyard operations.

2.5 SITE CHARACTERISTICS

2.5.1 Physical Characteristics

OU4 is the offshore area of the Piscataqua River and Back Channel around PNS potentially impacted by onshore IR Program sites and Site 5 (former industrial waste outfalls), and it is delineated by 14 monitoring stations. Area industries that may also affect the offshore area of PNS include retail and wholesale trades, textiles, manufacturing, fishing, shipbuilding, power plants, and gas storage facilities.

All of the monitoring stations are located at sea level, with any changes in elevations being caused by the tide. Semi-diurnal tidal currents, the horizontal motions associated with tidal changes in water levels, predominate in Portsmouth Harbor. Near Seavey Island, the mean tidal range is 8.1 feet. The overall ebb and flood currents in the vicinity of PNS are high. The average flood currents range from 3.0 knots south of Seavey Island to 3.3 knots southwest of Badgers Island (located approximately 1,000 feet east of PNS). The average ebb currents are 3.8 knots south of Seavey Island and 3.7 knots southwest of Badgers Island. Because of the strong currents, most ships wait for favorable tides before moving up and down the narrow Piscataqua River. The estimated flushing rates of Portsmouth Harbor and the lower reaches of the Great Bay Estuary range from 3.3 to 6.3 tidal cycles.

The offshore areas at PNS include pelagic, channel bottom/subtidal, eelgrass, intertidal mudflat, rocky intertidal, and salt marsh habitats. The pelagic habitat around PNS is the open water of the Piscataqua River, which includes the Back Channel, Jamaica Cove, and Clark Cove. The channel bottom/subtidal habitat is the bottom of the pelagic area and includes hard-bottom areas and fine-grained depositional areas. Eelgrass habitats occur in subtidal areas by Jamaica Cove, Clark Cove, Sullivan Point, the Dry Docks, and in the Back Channel. Intertidal mudflats are generally muddy-sand or sandy-mud areas fringing the shoreline along the Back Channel, off Jamaica Island (in Jamaica Cove), and around Clark's Island. The rocky intertidal habitat occurs in many locations along Seavey and Jamaica Islands where the shoreline is exposed to river currents and where there are no appreciable fine-grained sediment accumulations (such as at MS-11). Salt marsh habitats have been identified in Clark Cove, by Clark's Island, and in the Back Channel (including Jamaica Cove).

No known endangered, threatened, or protected species or critical habitats are located within the boundaries of PNS. However, the entire State of Maine is considered a habitat of the federally listed endangered short-nosed sturgeon, and the Gulf of Maine population of Atlantic sturgeon is listed as a threatened species. PNS also does not include areas designated as Essential Habitat by the State of Maine. Essential habitats are habitats necessary to the conservation of endangered or threatened species, as determined by Maine Endangered Species Act and Regulations based on observation of the species and confirmed habitat use. Clark's Island, located on the eastern side of PNS offshore of MS-09, requires special consideration because of its use by colonial nesting seabirds (nesting season is from April 1 to August 15).

2.5.2 Conceptual Site Model

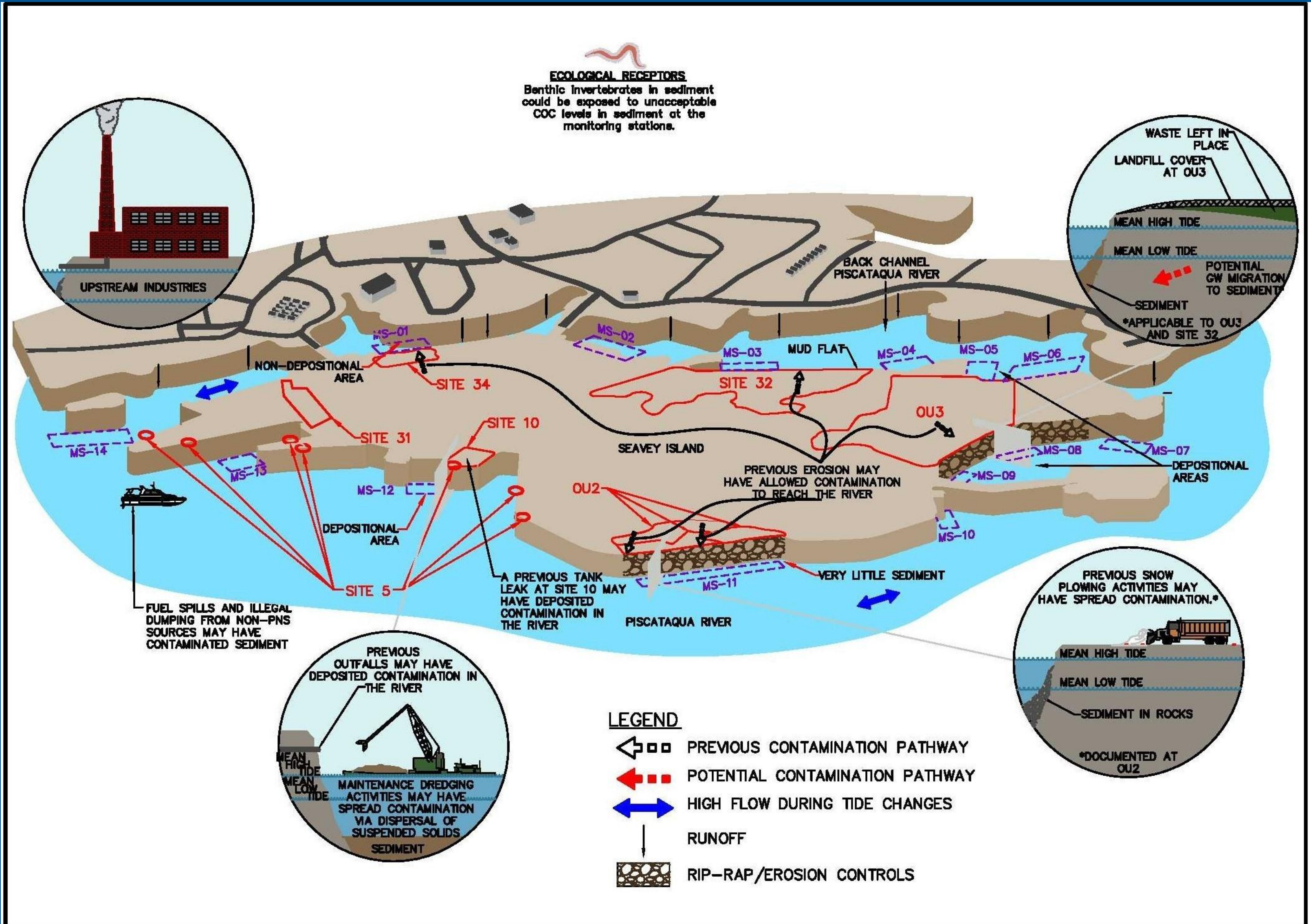
Figure 2-2 presents the OU4 conceptual site model, which identifies contaminant sources, transport routes, and potential receptors. The primary sources of contamination to OU4 were from past releases from Site 5 and PNS onshore IR Program sites. There are also non-IR and non-PNS sources of contamination to the offshore area.

Contaminants from onshore PNS IR Program sites were released to soil and groundwater at onshore sites primary through spills, placement on soil, and burying in soil. These contaminants were then released to the offshore area through erosion, runoff, and groundwater discharge. Also, contaminants from some sites were directly discharged to the offshore area. Several possible secondary sources of contamination exist, including physical movement of contaminated soil at IR Program sites prior to paving or placement of other cover material over the contaminated soil, offshore sediment dredging activities that took place at PNS without the use of turbidity curtains, contaminated groundwater migration to sediment, tidal erosion and storm water runoff from IR Program sites and non-IR Program sites, and non-PNS-related activities such as boating and fishing activities. As discussed in Section 2.1, there is little potential for current significant releases of contaminants from the IR Program sites to the offshore area. Future potential releases from onshore IR Program sites are being addressed as part of the onshore IR Program sites.

Along the Piscataqua River there is a large amount of industry and urbanization. The contaminants detected in sediments at PNS, primarily metals and PAHs, can be found to varying degrees in non-PNS discharges and operations along the Piscataqua River from sources such as local industries, urban non-point-source runoff, municipal water treatment discharges, and fuel or oil terminals. PAHs from the use of petroleum products in fuels and road surfaces can reach sediment through surface runoff from PNS and non-PNS areas. PCBs may be attributed to past activities in the watershed, and although numerous potential sources of contamination were identified, their relative contributions to sediment contamination adjacent to PNS could not be definitively established.

The primary ecological risk to benthic invertebrates from OU4 is from exposure to bioavailable/bioaccessible COCs in sediment. Exposure routes of contaminants in sediment to benthic invertebrates include direct contact, direct ingestion, and ingestion of prey. The biologically active zone in sediment varies depending on season, grain size, and currents. Sediment from 0 to 10 centimeters (cm) includes the biologically active zone (benthic organisms are living and mixing sediment within this depth)

FIGURE 2-2. CONCEPTUAL SITE MODEL



and was the general depth of surficial sediment samples collected during previous sediment investigations around PNS. Although various ecological and human receptors may be present and come into contact with surface water and sediment in the offshore area, it was determined through previous investigations that the primary receptors of concern for the offshore area were benthic invertebrates exposed to sediment. Human exposure to surface water and sediment and ecological exposure to surface water were determined not to be concerns for OU4. In addition, ingestion of fish or shellfish was also determined not be a concern for OU4.

2.5.3 Nature and Extent and Fate and Transport of Contamination

The COCs detected in sediment samples at OU4 based on the Interim Offshore Monitoring Program results are select metals and PAHs. The monitoring program showed that concentrations of COCs at MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-13, and MS-14 were less than ecological risk levels.

At MS-11, copper, lead, and nickel are the COCs that resulted from past erosion of soil from the OU2 shoreline. With the installation of shoreline erosion controls, erosion is no longer occurring along the OU2 shoreline. The offshore area of OU2 is rocky, and there is a minimal amount of fine-grained sediment at MS-11; therefore, there is not sufficient sediment to cause ecological risk. In the one location where a small amount of sediment was found, concentrations of copper, lead, and nickel exceeded ecological risk levels in two to six of the seven sampling rounds conducted prior to installation of the shoreline erosion controls. Concentrations of COCs were less than ecological risk levels in samples collected during the one round of sampling at MS-11 conducted after placement of the shoreline erosion controls (Round 11).

MS-01 is located in the western portion of the Back Channel AOC, offshore of Site 34 (OU9) and adjacent to the bridge leading to Gate No. 1. PAH concentrations in sediment at MS-01 exceeded acceptable ecological levels and likely resulted from past erosion of ash from past operations at OU9. Sediment contamination was found in the intertidal and subtidal portions of the monitoring station. The monitoring station is located in an area where the width of the channel decreases and the water velocity is very fast during incoming and outgoing tides. As a result, there is more sand and less silt in sediment at this station. Sediment contamination was generally 0 to 2 feet below sediment surface (bss).

MS-03 and MS-04 are located in the eastern portion of the Back Channel AOC, offshore of Site 32 (OU7). Copper and nickel concentrations in sediment at MS-03 and copper, nickel, and PAH concentrations in sediment at MS-04 exceeded acceptable ecological levels and are associated with past erosion of fill material located in the onshore area adjacent to these monitoring stations. Debris, including foundry slag, was found eroding from fill material along the shoreline, and the surface debris was subsequently removed and shoreline controls placed in the mid- to high-tide area of the OU7 shoreline. The removal action addressed the majority of contaminated sediment, including the nickel contamination. Residual contamination (copper at MS-03 and copper and PAHs at MS-04) was found in some areas within the mid- to low-tide portion of the monitoring stations. Sediment contamination was generally 0 to 2 feet bss.

MS-12 is located in a depositional area that includes the area offshore of Site 5, Site 10 (OU1), and Building 178 within the Dry Docks AOC. The floor of Building 178, in the southern portion of the building (closest to the water), slopes down to the Piscataqua River outside the building. At high tide, river water enters approximately 100 feet into the building on this ramp. As a result, sediment was present on the floor of the building on the portion of the ramp that is inundated with water at high tide. Sediment within the building and a portion of the ramp outside the building was removed in 2013 (see Appendix G). The ramp ends outside the building approximately 140 feet offshore of the building wall. There is an eelgrass bed in the subtidal portion of the ramp. Concentrations of lead and PAHs in remaining sediment on the ramp are greater than acceptable ecological levels, except within the eelgrass bed. Concentrations in sediment in the eelgrass bed are acceptable. Samples collected east of the ramp from subtidal sediment along the berth by Site 10 had lead concentrations greater than acceptable levels. Sediment contamination was generally 0 to 1 feet bss, although some areas on the ramp had contamination approximately 2 to 3 feet bss.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The current land use patterns at PNS are well established and are not expected to change in the foreseeable future. Industrial areas that support maintenance of submarines are in the western portion of the facility, and include all of the dry docks and submarine berths and numerous buildings that house trade shops related to the maintenance activities. Uses of other portions of PNS include administration offices, officers' residences, equipment storage, parking, and recreational facilities.

The offshore area of PNS currently and historically has been used for boat docks and piers and for vessel transport as part of Shipyard operations. The Piscataqua River and Back Channel near PNS are also used for non-Navy activities including commercial and recreational boat traffic and receive discharges from municipal and industrial operations and treatment plants. The Piscataqua River is also used for commercial and recreational activities such as boating, fishing, and lobstering. Various vessels operate in Portsmouth Harbor, including commercial tankers, cargo ships, fishing trawlers, lobster boats, recreational vessels, and submarines located at PNS. Future uses of the offshore area of PNS are expected to be consistent with current uses.

PNS does not use groundwater for any purpose. Potable water is supplied to PNS from the Kittery Water District, which uses surface reservoirs located in the vicinity of York, Maine. The Piscataqua River is saline and is not suitable for human consumption.

2.7 SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the site poses if no action was taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. An HHRA was conducted in 1994 and data were re-evaluated in 1998 to estimate the probability and magnitude of potential adverse human health effects from exposure to contaminants associated with OU4 using data collected as part of the EERA. In addition, a Public Health Assessment for the PNS offshore area was conducted by ATSDR in 2007.

An EERA for PNS was conducted to evaluate ecological risks for OU4. The EERA was conducted in two phases (Phase I in 1991 and Phase II in 1993) and included analysis and evaluation of various parameters including toxicity, population of several types of vegetation and aquatic life, and chemical analysis of sediment, surface water, and biological samples. The Final EERA Report was published in 2000.

2.7.1 Summary of Human Health Risk

The quantitative 1994 HHRA was conducted using chemical concentrations detected in surface water, sediment, and tissue (lobster, mussel, and flounder) samples collected at locations adjacent to PNS and at reference locations. The HHRA identified uses of the Piscataqua River including commercial and recreational fishing and lobstering. Fish include striped bass, bluefish, salmon, eels, cod, shad, smelt, river herring, flounder, and shellfish (e.g., mussel). The HHRA calculated potential human health risks using Phase I (1991) data. A comparison of Phase I and Phase II data was conducted to determine whether there were any impacts on the HHRA conclusions. Appendix D.1 provides summary information and tables related to human health risks for OU4.

Identification of Chemicals of Potential Concern

All chemicals that were detected in at least one sample were identified as COPCs for quantitation of risks. COPC identification did not consider whether the chemicals were site related or less than background concentrations. Maximum, mean, and 95-percent upper confidence limits (UCLs) on the mean were calculated for all of the COPCs.

Exposure Assessment

During the exposure assessment, current and potential future exposure pathways through which humans might come into contact with sediment, surface water, and/or biota were evaluated. Potential exposure routes for sediment include ingestion (swallowing small amounts of sediment) and dermal contact (skin exposure). Possible exposure routes for surface water include ingestion (swallowing small amounts of surface water). Possible exposure routes for biota include consumption of lobster tail flesh, consumption of whole lobster, consumption of mussel, and consumption of flounder filet. The HHRA considered receptor exposure under current and likely future land uses (recreation and subsistence fishing). Average and maximum concentrations were used as exposure point concentrations (EPCs) for calculation of average and maximum potential risks. Tables 3-1 through 3-58 from the 1994 HHRA, provided in Appendix D.1, provide exposure assessment input information including EPCs, ingestion rates, and exposure frequencies and durations.

Toxicity Assessment

Toxicity assessment involves identifying the types of adverse health effects caused by exposure to COPCs and determining the relationship between the magnitude of exposure and the severity of adverse effects (i.e., dose-response relationship) for each COPC. Based on the quantitative dose-response relationships determined, toxicity values for both cancer (cancer slope factor [CSF]) and non-cancer (reference dose [RfD]) effects were derived and used to estimate the potential for adverse effects. Tables 5A and 5-1 to 5-63 from the 1994 HHRA are provided in Appendix D.1 and include carcinogenic and non-carcinogenic hazard information.

Because published toxicity criteria are not available for lead, residential exposure to lead in at OU4 was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) Model, as recommended by USEPA. The blood-lead concentration of a receptor is considered a key indicator of the potential for adverse health effects from lead contamination. The IEUBK Model calculates the probability of a receptor's blood-lead level exceeding 10 microgram per deciliter (µg/dL), the minimum concentration considered to be a "concern." In addition, the USEPA goal is to limit the risk (i.e., probability) of exceeding a 10 µg/dL blood-lead concentration to 5 percent of the population. Input information for the IEUBK Model analyses provided in Tables 5-64 to 5-69 from the 1994 HHRA are included in Appendix D.1.

Risk Characterization

During the risk characterization, the outputs of the exposure and toxicity assessments are combined to characterize the baseline risk (cancer risks and non-cancer hazards) at the site if no action was taken to address the contamination. Potential cancer risks and non-cancer hazards were calculated based on mean and maximum concentrations for recreational exposure and subsistence fishing.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF}$$

where: risk = a unitless probability (e.g., 2×10^{-5}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years [in milligram/kilogram (mg/kg)-day]
SF = slope factor (in mg/kg-day^{-1})

These calculated risks are probabilities that are usually expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual has an "excess lifetime cancer risk" of one in a million in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. USEPA's generally acceptable risk range for site-related exposures is 1×10^{-6} to 1×10^{-4}.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., a lifetime) to an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed that is not expected to cause any deleterious effect. The ratio of exposure dose to the RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD and that toxic non-carcinogenic effects from that chemical are unlikely. The hazard index (HI) is typically generated by adding the HQs for all chemicals that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may be reasonably exposed. An HI less than 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI} / \text{RfD}$$

where: CDI = chronic daily intake
RfD = reference dose

CDIs and RFDs are expressed in the same units and represent the same exposure period (i.e., chronic, sub-chronic, or short-term).

For the HHRA, calculation of the HI did not identify the target organs affected by chemicals and target organ-based HIs were not calculated.

Tables 5-1 to 5-63 in the HHRA provide cancer risk and non-cancer hazard estimates for surface water and sediment exposure and for seafood ingestion and Tables 5-64 to 5-69 in the HHRA provide lead IEUBK results. A summary of the risk results is provided in Table 5A in the HHRA. These tables are included in Appendix D.1.

Total cancer risk estimates for exposure to surface water and sediment were less than 2×10^{-6} and were within or less than the acceptable USEPA risk range of 1×10^{-6} to 1×10^{-4}. HIs were less than 1.0. Total cancer risk estimates for ingestion of seafood ranged from approximately 1×10^{-4} to 6×10^{-3}, and HIs ranged from approximately 5 to 42. Lead risks for ingestion were acceptable. These risk estimates did not separate risks from background. Chemicals contributing to the risks were arsenic, pesticides (aldrin and DDE), PAHs, and PCBs. Based on studies within the Piscataqua River, concentrations of these chemicals causing potentially unacceptable risks around PNS were generally similar to or less than concentrations in background samples or in other coastal waters of Maine. In addition, the 2007 ATSDR Public Health Assessment for PNS concluded that adults and children consuming fish or shellfish, or wading in surface water or sediment are not likely to experience adverse health effects from the levels of chemicals in those media. For these reasons, human health risks were found to be acceptable, and no monitoring stations require remedial action based on human health risks.

2.7.2 Summary of Ecological Risk

An EERA was conducted at PNS that evaluated risks to ecological receptors in the offshore area. The purpose of the EERA was to assess potential adverse environmental effects from past discharges of contaminants from PNS to the offshore environments of the Piscataqua River and Great Bay Estuary. Two functional phases of the EERA were developed to fulfill this objective. Phase I of the EERA, initiated in September 1991 and completed in May 1993, assessed environmental quality in the Great Bay Estuary, focusing on the lower Piscataqua River area. The objective of Phase II of the EERA, initiated in July 1992 and completed in summer 1995, was to test hypotheses from Phase I and characterize the ecological risk from PNS. Studies conducted during Phase I included a chemical markers evaluation; sediment textural description; water column conditions evaluation; infaunal invertebrate assessment; microbiological contamination studies; sediment and water column toxicity tests; eelgrass community investigation; macroalgal community assessment; flounder and lobster population assessment; blue mussel population survey; deployment of blue mussels for tissue residue analysis; and chemical analyses of various media from Great Bay Estuary evaluation. During Phase II, studies included a chemical marker evaluation, sediment textural description; eelgrass community investigation; lobster use of eelgrass habitat studies; salt marsh community investigation; microbiological contamination studies; winter flounder investigation; blue mussel population study; infaunal invertebrate assessment; contaminant levels in lobster, mussel, eelgrass, and winter flounder evaluation; exposure and response investigations; estuarine dynamics and water quality assessment; and water column conditions characterization.

Phase I and Phase II data and conclusions were synthesized to assess potential risks to the estuarine environment in the vicinity of PNS. A model was developed for the EERA that described exposure pathways for contaminants, identified habitats and components of the ecosystem at risk, and defined AOCs around PNS. The habitats and components of the ecosystem at risk were grouped as assessment endpoints for the evaluation of risk. Communities selected as assessment endpoints to assess their vitality and related exposure levels to potential effects were pelagic, epibenthic, benthic, eelgrass, salt marsh, and avian. Data were developed to evaluate stressor exposure level and to assess ecological effects. Screening procedures were conducted to identify contaminants and areas of concern and to identify links to sources of contaminant releases from PNS.

Measurements of chemical concentrations in water, sediment, and tissues of estuarine receptors, and measurements of the health and status of ecological receptors were conducted in the AOCs and in reference areas to evaluate ecological risk. A weight-of-evidence approach was used to characterize risk for each assessment endpoint at each AOC. The weight-of-evidence approach considered the strengths and weaknesses of the various measurement methods of exposure and effect to draw conclusions from the multiple measures collected during the EERA. Tables 1-1 to 1-3, 4-1 to 4-3, 7-1 to 7-13, and 8-1 from the EERA that show the routes of exposure and measurement for chemical concentrations, assessment endpoints, weight-of-evidence evaluations, and risk conclusions are provided in Appendix D.2.

The conclusion of the EERA was that most AOCs had either low or intermediate overall risk. No assessment endpoints had high risk. The ecological risks for each assessment endpoint were linked to surface water and/or sediment exposure for chemicals that may have originated from onshore IR Program sites (i.e., COPCs). COPCs were identified as the chemicals that were more likely to exceed benchmark concentrations than ambient concentrations were likely to exceed benchmark concentrations, and that could be linked to an onshore IR Program site. Risks for exposure to surface water were low or negligible for all of the AOCs. Risks for exposure to sediment were low for Clark Cove and Jamaica Cove AOCs and intermediate for Sullivan Point, Dry Dock, and Back Channel AOCs. Sediment was not present at the DRMO Storage Yard AOC. The COPCs identified for the AOCs included metals, PCBs, and PAHs.

The results of the EERA were used to develop the Interim Offshore Monitoring Program for OU4. Based on the intermediate risks for sediment, sediment monitoring was conducted as a primary measure to determine whether the interim RAOs were being met. Monitoring stations were identified to represent the AOCs as shown in Table 2-2.

TABLE 2-2. AOCS AND ASSOCIATED MONITORING STATIONS

AOC	MONITORING STATION
Clark Cove	MS-07, MS-08, MS-09
Sullivan Point	MS-10
DRMO Storage Yard	MS-11
Dry Docks	MS-12, MS-13, MS-14
Back Channel	MS-01, MS-02, MS-03, MS-04
Jamaica Cove	MS-05, MS-06

To support the Interim Offshore Monitoring Program, sediment-based PRGs were developed for use as IRGs to provide quantitative means for evaluating the interim monitoring data. The PRGs were developed using site-specific sediment and pore-water toxicity testing data and associated sediment and pore-water chemical concentrations for samples collected during Round 2 of the Interim Offshore Monitoring Program. The PRGs were developed for chemicals potentially causing the greatest offshore impact, termed the "limiting COCs." Toxicity test results were used to identify non-toxic and toxic samples. Pore-water concentrations for non-toxic and toxic samples for the monitoring stations were compared to surface water quality criteria and reference pore-water concentrations to ensure that the concentrations of potential risk (referred to as threshold effect levels) were not less than the criteria or reference concentrations. The pore water-based threshold effect levels were used to identify the limiting COCs and the associated sediment concentrations representing potential risk. The calculated, site-specific, sediment-based PRGs were then compared to the risk conclusions of the EERA to determine whether exeedances of PRGs coincided with areas associated with low or intermediate risk. The resultant PRGs were then used as the basis for development of the IRGs for the following limiting COCs: copper, nickel, acenaphthylene, anthracene, fluorene, and HMW PAHs. Lead was not identified as a limiting COC; however, because onshore sources of lead contamination existed at some of the sites, a literature value (NOAA Incidence of Adverse Biological Effects within Ranges of Chemical Concentration in Marine and Estuarine Sediments) was used to evaluate lead data. Because the copper and nickel IRGs were approximately two times NOAA's effects range-median (ER-M), two times the ER-M was used as the IRG for lead.

The IRGs were used to evaluate sediment data collected as part of the Interim Offshore Monitoring Program. Based on an evaluation of the first 10 rounds of offshore monitoring data, along with other sediment data collected at some of the monitoring stations, chemicals presenting an ecological risk in sediment were retained as COCs at four monitoring stations (MS-01, MS-03, MS-04, and MS-12) (see Table 2-3). There is not sufficient sediment to cause ecological risk at MS-11 and there were no COCs with current concentrations presenting ecological risk at MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-13, or MS-14. Based on current concentrations at MS-01, MS-03, MS-04, and MS-12, nickel is not a COC for any of these stations.

TABLE 2-3. CHEMICALS RETAINED AS COCS AT EACH MONITORING STATION

COC	MS-01	MS-03	MS-04	MS-12A	MS-12B
Copper		X	X		
Lead				X	X
Acenaphthylene	X		X	X	
Anthracene	X		X	X	
Fluorene	X		X	X	
HMW PAHs	X		X	X	

2.7.3 Basis for Action

As a result of past activities at onshore IR Program sites, contamination is present in sediment at OU4 offshore of PNS at concentrations that could result in unacceptable risks to benthic invertebrates if action is not taken to prevent exposure to contaminated sediment at MS-01, MS-03, MS-04, and MS-12. Based on potential site risks, the COCs identified are copper, lead, acenaphthylene, anthracene, fluorene, and HMW PAHs. Because risks were identified under current and future potential land use scenarios for benthic invertebrates, a response action is necessary to protect the environment from actual or threatened releases of hazardous substances into the environment, which may present an imminent and substantial endangerment to ecological receptors.

2.8 REMEDIAL ACTION OBJECTIVES

RAOs are medium-specific goals that define the objective of conducting remedial actions to protect human health and the environment. RAOs specify the COCs, potential exposure routes and receptors, and acceptable concentrations (i.e., cleanup levels) for a site and provide a general description of what the cleanup will accomplish. RAOs typically serve as the design basis for the remedial alternatives described in Section 2.9. The RAO developed for OU4 considering current and future land use at PNS is as follows:

- Eliminate unacceptable risk to ecological benthic receptors exposed to site-related COCs in suitable sediment habitats.

The sediment cleanup levels for benthic invertebrates were developed in the OU4 FS and are based on site-specific sediment and pore-water toxicity tests conducted as part of the Interim Offshore Monitoring Program (as discussed in Section 2.7.2). These cleanup levels are sediment-based values that are protective of sensitive ecological receptors (i.e., benthic invertebrates) exposed to COCs in sediment at OU4. The cleanup levels are goals for representative exposure concentrations across the monitoring station and not intended as maximum allowable or pick-up levels. Cleanup levels for COCs at OU4 are summarized in Table 2-4.

TABLE 2-4. CLEANUP LEVELS

COC	SEDIMENT CLEANUP LEVEL FOR BENTHIC INVERTEBRATES	BASIS	MONITORING STATION
Copper	486 mg/kg	IRG	MS-03, MS-04
Lead	436 mg/kg	two times ER-M	MS-12A, MS-12B
Acenaphthylene	210 microgram/kilogram (μg/kg)	IRG	MS-01, MS-04, MS-12A
Anthracene	1,236 μg/kg	IRG	MS-01, MS-04, MS-12A
Fluorene	500 μg/kg	IRG	MS-01, MS-04. MS-12A
HMW PAHs	13,057 μg/kg	IRG	MS-01, MS-04, MS-12A

2.9 DESCRIPTION OF ALTERNATIVES

To address potential unacceptable ecological risks associated with contamination at OU4, a preliminary technology screening evaluation was conducted in the FS. The general response actions are presented in Table 2-5.

TABLE 2-5. GENERAL RESPONSE ACTIONS

GENERAL RESPONSE ACTION	TECHNOLOGY	PROCESS OPTIONS
No Action	None	Not Applicable
Limited Action	LUCs	Active Controls: Physical Barriers/Security Guards
		Passive Controls: Land Use Restrictions
	Monitoring	Sampling and Analysis
	Monitored Natural Recovery	Sampling to Assess Degradation of Contaminants
Containment	Source Containment	Barrier Installation
Removal	Bulk Excavation/Dredging	Mechanical Removal
		Mechanical Dredging
		Hydraulic Dredging
Ex-Situ Treatment	Physical/Chemical	Dewatering
Disposal	Landfill/Recycling	Off-Yard Landfilling/Recycling

The technologies and process options retained after detailed screening were assembled into remedial alternatives. MS-01 was evaluated separately. The types and concentrations of contaminants at MS-03 and MS-04 are similar; therefore, the areas were combined for development of cleanup alternatives. MS-12 was separated into two areas for development of remedial alternatives, MS-12A and MS-12B. Consistent with the NCP, the no action alternative was evaluated as a baseline for comparison with other alternatives during the comparative analysis. Tables 2-6, 2-7, 2-8, and 2-9 describe the major components and provide cost estimates for remedial alternatives developed for MS-01, MS-03 and MS-04, MS-12A, and MS-12B, respectively.

TABLE 2-6. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED – MS-01

ALTERNATIVE	COMPONENTS	DETAILS	COST
Alternative MS01-01: No Action *No action to address contamination, and no use restrictions*	No action would be conducted	Five-year reviews would not be included under the no action alternative.	**Cost**: $0
Alternative MS01-02: Monitored Natural Recovery *Sediment monitoring to evaluate natural recovery, with LUCs to prevent sediment disturbance*	LUCs	LUCs to prevent unauthorized disturbance of sediment until concentrations of COCs are at acceptable levels.	**Capital**: $17,094 **30-Year NPW**: $311,538
	Monitoring	Sediment sampling for PAHs to determine when concentrations have decreased to acceptable levels.	
Alternative MS01-03: Hydraulic Dredging with Off-Yard Disposal *Dredging of contaminated sediment from approximately 0 to 2 feet bss, with dewatering and off-yard disposal.*	Sediment Removal	Removal of contaminated sediment within MS-01 to reduce PAH concentrations to acceptable levels.	**Capital**: $917,661 **30-Year NPW**: $917,661
	Sampling	Sampling during dredging activities to monitor the effectiveness of sediment migration controls. Confirmation sampling to make sure that contaminated sediment is removed.	
	Dewatering	Removal of water from excavated sediment before off-yard disposal.	
	Off-Yard Disposal	Transportation and disposal of all dredged sediment to an off-yard treatment, storage, and disposal (TSD) facility upon completion of dewatering and characterization.	

TABLE 2-7. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED – MS-03 AND MS-04

ALTERNATIVE	COMPONENTS	DETAILS	COST
Alternative MS0304-01: No Action *No action to address contamination, and no use restrictions*	No action would be conducted	Five-year reviews would not be included under the no action alternative.	Cost: $0

TABLE 2-7. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED – MS-03 AND MS-04

ALTERNATIVE	COMPONENTS	DETAILS	COST
Alternative MS0304-02: Monitoring Natural Recovery *Sediment monitoring to evaluate natural recovery, with LUCs to prevent sediment disturbance*	LUCs	LUCs to prevent unauthorized disturbance of sediment until concentrations of COCs are at acceptable levels.	**Capital:** $17,094 **30-Year NPW**: $323,481
	Monitoring	Sediment sampling for copper at MS-03 and PAHs and copper at MS-04 to determine when concentrations have decreased to acceptable levels.	
Alternative MS0304-03 Hydraulic Dredging with Off-Yard Disposal *Dredging of contaminated sediment from approximately 0 to 2 feet bss in one area, and 0 to 1 foot bss in two areas, with dewatering and off-yard disposal*	Sediment Removal	Removal of contaminated sediment within MS-03 and MS-04 to reduce copper and PAH concentrations to acceptable levels	**Capital:** $745,410 **30-Year NPW:** $745,410
	Sampling	Sampling during dredging activities to monitor the effectiveness of sediment migration controls. Confirmation sampling to make sure that contaminated sediment is removed.	
	Dewatering	Removal of water from excavated sediment before off-yard disposal.	
	Off-Yard Disposal	Transportation and disposal of all dredged sediment to an off-yard TSD facility upon completion of dewatering and characterization.	

TABLE 2-8. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED – MS-12A

ALTERNATIVE	COMPONENTS	DETAILS	COST
Alternative MS12A-01: No Action *No action to address contamination, and no use restrictions*	No action would be conducted	Five-year reviews would not be included under the no action alternative.	Cost: $0
Alternative MS12A-02: Containment, LUCs, and Monitoring Natural Recovery *Containment with LUCs and monitoring for sediment inside Building 178, sediment monitoring to evaluate natural recovery outside Building 178*	Containment Barrier	Construction of a concrete wall as a containment barrier on the outside of Building 178 to prevent sediment within the intertidal area of Building 178 from migrating into the Piscataqua River.	**Capital:** $369,626 **30-Year NPW**: $675,807
	LUCs	LUCs to ensure that the containment barrier continues to function as designed.	
	Inspection and Monitoring for Containment System	Inspection to verify the continued integrity of the containment system. Monitoring to ensure that contamination in sediment contained within the building is not adversely impacting sediment outside the building.	
	Monitoring	Sediment sampling for PAHs and lead on the ramp outside Building 178 to determine when concentrations have decreased to acceptable levels.	

TABLE 2-8. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED – MS-12A

ALTERNATIVE	COMPONENTS	DETAILS	COST
Alternative MS12A-03 **Partial Removal, Off-Yard Disposal, Containment, and LUCs** *Dredging of contaminated sediment from approximately 0 to 1.5 feet bss on ramp outside Building 178, dewatering, and off-yard disposal, and containment, LUCs, and inspections of sediment within Building 178*	Sediment Removal	Removal of contaminated sediment in the tidal zone outside of Building 178, outside the limits of the eelgrass bed, to reduce PAH and lead concentrations to acceptable levels.	**Capital:** $1,305,682 **30-Year NPW:** $1,601,353
	Dewatering	Removal of water from excavated sediment before off-yard disposal.	
	Off-Yard Disposal	Transportation and disposal of all dredged sediment to an off-yard TSD facility upon completion of dewatering and characterization.	
	Containment	Construction of a concrete wall as a containment barrier on the outside of Building 178 to prevent sediment on the within the intertidal area of Building 178 from migrating into the Piscataqua River.	
	LUCs	LUCs to ensure that the containment barrier continues to function as designed.	
	Inspections	Inspection to verify the continued integrity of the containment system.	
Alternative MS12A-04 **Complete Removal with Off-Yard Disposal** *Dredging of contaminated sediment from approximately 0 to 1.5 feet bss on ramp outside Building 178, physical removal of sediment within Building 178, dewatering, and off-yard disposal*	Sediment Removal	Removal of contaminated sediment in the tidal zone outside of Building 178, outside the limits of the eelgrass bed, to reduce PAH and lead concentrations to acceptable levels.	**Capital:** $1,134,478 **30-Year NPW**: $1,134,478
	Physical Removal	Removal of sediment on the ramp within the intertidal area of Building 178 via power washing and/or physical removal (shovels, push-brooms, etc.) as needed to remove sediment from within the building.	
	Sampling	Sampling during dredging activities to monitor the effectiveness of sediment migration controls. Confirmation sampling to make sure that contaminated sediment is removed.	
	Dewatering	Removal of water from excavated sediment before off-yard disposal.	
	Off-Yard Disposal	Transportation and disposal of all removed sediment to an off-yard TSD facility upon completion of dewatering and characterization.	

TABLE 2-9. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED – MS-12B			
ALTERNATIVE	**COMPONENTS**	**DETAILS**	**COST**
Alternative MS12B-01: No Action *No action to address contamination, and no use restrictions*	No action would be conducted	Five-year reviews would not be included under the no action alternative.	Cost: $0
Alternative MS12B-02: Monitored Natural Recovery *Sediment monitoring to evaluate natural recovery, with LUCs to prevent sediment disturbance*	LUCs	LUCs to prevent unauthorized disturbance of sediment until concentrations of COCs are at acceptable levels.	**Capital:** $17,094 **30-Year NPW**: $309,149
	Monitoring	Sediment sampling for lead to determine when concentrations have decreased to acceptable levels.	
Alternative MS12B-03 Hydraulic Dredging with Off-Yard Disposal *Dredging of contaminated sediment from approximately 0 to 0.5 feet bss, with dewatering and off-yard disposal*	Sediment Removal	Removal of contaminated sediment within MS-12B to reduce lead concentrations to acceptable levels.	**Capital:** $428,824 **30-Year NPW:** $428,824
	Sampling	Sampling during dredging activities to monitor the effectiveness of sediment migration controls. Confirmation sampling to make sure that contaminated sediment is removed.	
	Dewatering	Removal of water from excavated sediment before off-yard disposal.	
	Off-Yard Disposal	Transportation and disposal of all dredged sediment to an off-yard TSD facility upon completion of dewatering and characterization.	

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Tables 2-10, 2-11, 2-12, and 2-13 and subsequent text in this section summarize the comparison of the remedial alternatives with respect to the nine CERCLA evaluation criteria outlined in the NCP at 40 CFR 300.430 (e)(9)(iii) and categorized as threshold, primary balancing, and modifying. Further information on the detailed comparison of remedial alternatives is presented in the OU4 FS.

TABLE 2-10: COMPARISON OF MS-01 REMEDIAL ALTERNATIVES			
CRITERION	**MS01-01**	**MS01-02**	**MS01-03**
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	15
Achieving the Cleanup Objectives	NA	24-48	15
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	◉	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	◉	◉
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	◉
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (NPW cost)	$0	$17,094 capital 30-year NPW: $311,538	$917,661capital 30-year NPW: $917,661
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	MEDEP concurs with Alternative MS01-03, and a letter of concurrence is included in Appendix A.		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	Comments received during the public comment period support Alternative MS01-03. Section 3.0 provides the Responsiveness Summary. Public comments received and responses are provided in Appendix C.		
Relative comparison of the nine balancing criteria and each alternative: ● – Good, ◉ – Average, ○ – Poor, NA – not applicable			

TABLE 2-11 COMPARISON OF MS-03 AND MS-04 REMEDIAL ALTERNATIVES

CRITERION	MS0304-01	MS0304-02	MS0304-03
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	15
Achieving the Cleanup Objectives	NA	60-120	15
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	**○**	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	**○**	**○**
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	**○**
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (NPW cost)	$0	$17,904 capital 30-year NPW: $323,481	$745,410 capital 30-year NPW: $745,410
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	MEDEP concurs with Alternative MS0304-03, and a letter of concurrence is included in Appendix A.		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	Comments received during the public comment period support Alternative MS0304-03. Section 3.0 provides the Responsiveness Summary. Public comments received and responses are provided in Appendix C.		
Relative comparison of the nine balancing criteria and each alternative: ● – Good, **○** – Average, ○ – Poor, NA – not applicable			

TABLE 2-12 COMPARISON OF MS-12A REMEDIAL ALTERNATIVES

CRITERION	MS12A-01	MS12A-02	MS12A-03	MS12A-04
Estimated Time Frame (months)				
Designing and Constructing the Alternative	NA	13	15	15
Achieving the Cleanup Objectives	NA	60-120	15	15
Criteria Analysis				
Threshold Criteria				
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●	●
Primary Balancing Criteria				
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	◉	◉	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	◉	●	●
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	◉	◉
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (NPW cost)	$0	$369,626 capital 30-year NPW: $675,807	$1,305,682 capital 30-year NPW: $1,601,353	$1,134,478 capital 30-year NPW: $1,134,478
Modifying Criteria				
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	MEDEP concurs with Alternative MS12A-04, and a letter of concurrence is included in Appendix A.			
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	Comments received during the public comment period support Alternative MS12A-04. Section 3.0 provides the Responsiveness Summary. Public comments received and responses are provided in Appendix C.			
Relative comparison of the nine balancing criteria and each alternative: ● – Good, ◉ – Average, ○ – Poor, NA – not applicable				

TABLE 2-13 COMPARISON OF MS-12B REMEDIAL ALTERNATIVES

CRITERION	MS12B-01	MS12B-02	MS12B-03
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	14
Achieving the Cleanup Objectives	NA	24-48	14
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	◉	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	◉	◉
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	◉
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (NPW cost)	$0	$17,094 capital 30-year NPW: $309,149	$428,824 capital 30-year NPW: $428,824
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	MEDEP concurs with Alternative MS12B-03, and a letter of concurrence is included in Appendix A.		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	Comments received during the public comment period support Alternative MS12B-03. Section 3.0 provides the Responsiveness Summary. Public comments received and responses are provided in Appendix C.		
Relative comparison of the nine balancing criteria and each alternative: ● – Good, ◉ – Average, ○ – Poor, NA – not applicable			

Threshold Criteria – MS-01

Overall Protection of Human Health and the Environment. The no action alternative would not achieve the RAO and would not protect the environment; therefore, it is not discussed further in this ROD. Both of the other MS-01 alternatives would be protective of human health and the environment.

Alternatives MS01-02 and MS01-03 are both consistent with current and reasonably anticipated industrial land use and would be equally protective of the environment because these alternatives would address contaminated sediment, through monitored natural recovery and removal, respectively, thereby preventing unacceptable exposure of ecological receptors. MS01-03 would prevent exposure to ecological receptors immediately upon implementation rather than relying on natural recovery to gradually decrease COC concentrations over time. LUCs would be required under MS01-02 until concentrations of COCs decrease to acceptable levels.

Compliance with ARARs. Applicable or Relevant and Appropriate Requirements (ARARs) include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. Alternatives MS01-02 and MS01-03 would meet the alternative-specific ARARs.

Primary Balancing Criteria – MS-01

Long-Term Effectiveness and Permanence. Alternative MS01-03 would provide greater long-term effectiveness and permanence than Alternative MS01-02. Alternative MS01-02 would depend on naturally occurring processes to reduce COC concentrations to acceptable levels prior to achieving long-term effectiveness and permanence. Alternative MS01-02 would include monitoring to determine when cleanup levels are achieved. Alternative MS01-03 would provide long-term effectiveness and permanence upon implementation by removing contaminated sediment, thus preventing ecological receptors from coming into contact with the contaminated sediment.

Reduction in Toxicity, Mobility, or Volume Through Treatment. Neither MS-01 alternative would involve an active process that would reduce the toxicity, mobility, or volume of COCs through treatment.

Short-Term Effectiveness. Alternative MS01-02 would have minimal short-term effectiveness concerns. Implementation of LUCs and monitoring would not adversely impact the surrounding community or the environment. Alternative MS01-03 would have some short-term effectiveness concerns for remediation construction workers and the environment related to removal and processing of contaminated material. However, these concerns could be effectively controlled using personal protective equipment (PPE), compliance with proper site-specific health and safety procedures, and use of best management practices (BMPs) to prevent exposure to and migration of contamination during construction and disposal activities.

Implementability. Alternative MS01-02 would have relatively few implementation difficulties because this alternative would include only development of a LUC remedial design (RD) and monitoring plan to document the necessary LUCs and monitoring. Alternative MS01-03 would be more difficult because this alternative would involve dredging, processing, and off-yard transportation and disposal of contaminated sediment. These activities would require additional access to the Shipyard and Shipyard offshore area, which would require coordination with Shipyard personnel for access to the facility and traffic control at the site. Alternative MS01-03 would use more fuel energy and landfill space than Alternative MS01-02. As a result, Alternative MS01-02 would have a smaller remedial carbon footprint than Alternative MS01-03.

Cost. The NPW costs for Alternatives MS01-02 and MS01-03 are $311,538 and $917,661, respectively.

Modifying Criteria – MS-01

State Acceptance. State involvement has been solicited throughout the CERCLA process. MEDEP, as the designated support agency in Maine, concurs with the MS-01 Selected Remedy.

Community Acceptance. No comments were received that changed the preferred remedial alternative for MS-01.

Threshold Criteria – MS-03 and MS-04

Overall Protection of Human Health and the Environment. The no action alternative would not achieve the RAO and would not protect the environment; therefore, it is not discussed further in this ROD. Both of the other MS-03/MS-04 alternatives would be protective of human health and the environment.

Alternatives MS0304-02 and MS0304-03 are both consistent with current and reasonably anticipated industrial land use and would be equally protective of the environment because these alternatives would address contaminated sediment, through monitored natural recovery and removal, respectively, thereby preventing unacceptable exposure of ecological receptors. Alternative MS0304-03 would prevent exposure to ecological receptors immediately upon implementation rather than relying on natural recovery to gradually decrease COC concentrations over time. LUCs would be required under Alternative MS0304-02 until concentrations of COCs decrease to acceptable levels.

Compliance with ARARs. ARARs include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. Alternatives MS0304-02 and MS0304-03 would meet the alternative-specific ARARs.

Primary Balancing Criteria – MS-03 and MS-04

Long-Term Effectiveness and Permanence. Alternative MS0304-03 would provide greater long-term effectiveness and permanence than Alternative MS0304-02. Alternative MS0304-02 would depend on naturally occurring processes to reduce COC concentrations to acceptable levels prior to achieving long-term effectiveness and permanence. Alternative MS0304-02 would include monitoring to determine when cleanup levels are achieved. Alternative MS0304-03 would provide long-term effectiveness and permanence upon implementation by removing contaminated sediment, thus preventing ecological receptors from coming into contact with the contaminated sediment.

Reduction in Toxicity, Mobility, or Volume Through Treatment. Neither MS-03/MS-04 alternative would involve an active process that would reduce the toxicity, mobility, or volume of COCs through treatment.

Short-Term Effectiveness. Alternative MS0304-02 would have minimal short-term effectiveness concerns. Implementation of LUCs and monitoring would not adversely impact the surrounding community or the environment. Alternative MS0304-03 would have some short-term effectiveness concerns for remediation construction workers and the environment related to removal and processing of contaminated material. However, these concerns could be effectively controlled using PPE, compliance with proper site-specific health and safety procedures, and use of BMPs to prevent exposure to and migration of contamination during construction and disposal activities.

Implementability. Alternative MS0304-02 would have relatively few implementation difficulties because this alternative would include only development of a LUC RD and monitoring plan to document the necessary LUCs and monitoring. Alternative MS0304-03 would be more difficult because this alternative would involve dredging, processing, and off-yard transportation and disposal of contaminated sediment. These activities would require additional access to the Shipyard and Shipyard offshore area, which would require coordination with Shipyard personnel for access to the facility and traffic control at the site. Alternative MS0304-03 would use more fuel energy and landfill space than Alternative MS0304-02. As a result, Alternative MS0304-02 would have a smaller remedial carbon footprint than Alternative MS0304-03.

Cost. The NPW costs for Alternatives MS0304-02 and MS0304-03 are $323,481 and $745,410 respectively.

Modifying Criteria – MS-03 and MS-04

State Acceptance*.* State involvement has been solicited throughout the CERCLA process. MEDEP, as the designated support agency in Maine, concurs with the MS-03/MS-04 Selected Remedy.

Community Acceptance*.* No comments were received that changed the preferred remedial alternative for MS-03/MS-04.

Threshold Criteria – MS-12A

Overall Protection of Human Health and the Environment. The no action alternative would not achieve RAOs and would not protect human health and the environment; therefore, it is not discussed further in this ROD. All of the other MS-12A alternatives would be protective of human health and the environment.

Alternatives MS12A-02, MS12A-03, and MS12A-04 are consistent with current and reasonably anticipated industrial land use and would be protective of human health and the environment. Alternatives MS12A-02 and MS12A-03 rely on a containment system to prevent contamination in the intertidal portion of Building 178 from migrating to offshore sediment. MS12A-04 would involve removing the contaminated sediment within Building 178. LUCs and inspections would be required for the containment system to ensure that it continues to function over the long term. For contaminated sediment on the ramp outside of Building 178, monitored natural recovery would prevent exposure under Alternative MS12A-02, and sediment removal would prevent exposure under Alternatives MS12A-03 and MS12A-04.

Compliance with ARARs. ARARs include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. Alternatives MS12A-02 through MS12A-04 would meet the alternative-specific ARARs.

Primary Balancing Criteria – MS-12A

Long-Term Effectiveness and Permanence*.* Alternative MS12A-04 would have the greatest long-term effectiveness and permanence because all sediment contamination associated with potentially unacceptable risk would be removed from MS-12A. Long-term effectiveness and permanence is slightly better for Alternative MS12A-03 than Alternative MS12A-02. Alternative MS12A-03 would be effective and would permanently remove sediment contamination from outside Building 178; however, continued operation of the containment system would be required for contamination inside Building 178. Alternative MS12A-02 would eventually provide long-term effectiveness and permanence once COC concentrations are reduced to acceptable levels. The containment barrier associated with MS12A-02 would be effective in preventing the migration of Building 178 contaminants to the Piscataqua River but would require long-term inspections and maintenance to ensure effectiveness.

Reduction in Toxicity, Mobility, or Volume Through Treatment*.* None of the alternatives being considered would involve an active process that would reduce the toxicity, mobility, or volume of COCs through treatment.

Short-Term Effectiveness*.* Alternatives MS12A-02, MS12A-03, and MS12A-04 would have similar short-term effectiveness concerns for remediation construction workers and the environment related to placement of the containment barrier (MS12A-02 and MS12A-03) and for removal and processing of contaminated material (MS12A-03 and MS12A-04). However, these concerns for each alternative could be effectively controlled using PPE, compliance with proper site-specific health and safety procedures, and use of BMPs to prevent exposure to and migration of contamination during construction and disposal activities.

Implementability. Alternative MS12A-02 would be the easiest to implement because it does not involve the removal of sediment and because construction activities would be kept to a minimum with the construction of a concrete block wall. Alternative MS12A-04 would be more difficult to implement than Alternative MS12A-03 because Alternative MS12A-04 would also require the removal of sediment inside Building 178 in addition to removal of sediment outside Building 178. All the alternatives would have similar requirements for access to the Shipyard and Shipyard offshore area, which would require coordination with Shipyard personnel for access to the facility and traffic control at the site. Alternative MS12A-02 would require the least amount of energy usage. Alternatives MS12A-03 and MS12A-04 would require a significant amount of fuel energy and landfill space use. Of the two, Alternative MS12A-03 would not use as much energy or landfill space as Alternative MS12A-04. Alternative MS12A-02 would have the smallest remedial carbon footprint, followed by Alternative MS12A-03, and then Alternative MS12A-04.

Cost. The NPW costs for Alternatives MS12A-02, MS12A-03, and MS12A-04 are $675,807, $1,601,353, and $1,134,478, respectively.

Modifying Criteria – MS-12A

State Acceptance. State involvement has been solicited throughout the CERCLA process. MEDEP, as the designated support agency in Maine, concurs with the Selected Remedy for MS-12A.

Community Acceptance. No comments were received that changed the preferred remedial alternative for MS-12A.

Threshold Criteria – MS-12B

Overall Protection of Human Health and the Environment. The no action alternative would not achieve RAOs and would not protect human health and the environment; therefore, it is not discussed further in this ROD. Both of the other MS-12B alternatives would be protective of human health and the environment.

Alternatives MS12B-02 and MS12B-03 are both consistent with current and reasonably anticipated industrial land use and would be equally protective of the environment because these alternatives would address contaminated sediment, through monitored natural recovery and removal, respectively, thereby preventing exposure of ecological receptors. Alternative MS12B-03 is slightly more protective as it would prevent unacceptable exposure of ecological receptors immediately upon implementation rather than relying on natural recovery to gradually decrease COC concentrations over time. LUCs would be required under Alternative MS12B-02 until concentrations of COCs decrease to acceptable levels.

Compliance with ARARs. ARARs include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. Alternatives MS12B-02 and MS12B-03 would meet the alternative-specific ARARs.

Primary Balancing Criteria – MS-12B

Long-Term Effectiveness and Permanence. Alternative MS12B-03 would provide greater long-term effectiveness and permanence than Alternative MS12B-02. Alternative MS12B-02 would depend on naturally occurring processes to reduce COC concentrations to acceptable levels prior to achieving long-term effectiveness and permanence. Alternative MS12B-02 would include monitoring to determine when cleanup levels are achieved. Alternative MS12B-03 would provide long-term effectiveness and permanence upon implementation by removing contaminated sediment, thus preventing ecological receptors from coming into contact with the contaminated sediment.

Reduction in Toxicity, Mobility, or Volume Through Treatment. Neither MS-12B alternative would involve an active process that would reduce the toxicity, mobility, or volume of COCs through treatment.

Short-Term Effectiveness. Alternative MS12B-02 would have minimal short-term effectiveness concerns. Implementation of LUCs and monitoring would not adversely impact the surrounding community or the environment. Alternative MS12B-03 would have some short-term effectiveness concerns for remediation construction workers and the environment related to removal and processing of contaminated material. However, these concerns could be effectively controlled using PPE, compliance with proper site-specific health and safety procedures, and use of BMPs to prevent exposure to and migration of contamination during construction and disposal activities.

Implementability. Alternative MS12B-02 would have relatively few implementation difficulties because this alternative would include only development of a LUC RD and monitoring plan to document the necessary LUCs and monitoring. Alternative MS12B-03 would be more difficult because this alternative would involve dredging, processing, and off-yard transportation and disposal of contaminated sediment. These activities would require additional access to the Shipyard and Shipyard offshore area, which would require coordination with Shipyard personnel for access to the facility and traffic control at the site. Alternative MS12B-03 would use more fuel energy and landfill space than Alternative MS12B-02. As a result, Alternative MS12B-02 would have a smaller remedial carbon footprint than Alternative MS12B-03.

Cost. The NPW costs for Alternatives MS12B-02 and MS12B-03 are $309,149 and $428,824, respectively.

Modifying Criteria – MS-12B

State Acceptance. State involvement has been solicited throughout the CERCLA process. MEDEP, as the designated support agency in Maine, concurs with the Selected Remedy for MS-12B.

Community Acceptance. No comments were received that changed the preferred remedial alternative for MS-12B.

2.11 PRINCIPAL THREAT WASTE

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. At OU4, contaminated sediment concentrations are not highly toxic or highly mobile; therefore, principal threat wastes are not present at the site.

2.12 SELECTED REMEDIES

2.12.1 Rationale for Selected Remedies

Onshore removal actions and remedial actions have been conducted to eliminate the sources of contamination to the offshore from onshore IR Program sites, and reduction in concentrations of COCs in sediment at the various monitoring stations have been observed over the course of the Interim Offshore Monitoring Program. However, residual concentrations of COCs in portions of MS-01, MS-03, MS-04, and MS-12 remain at levels that pose potentially unacceptable ecological risk. The Selected Remedies for these stations include removal of contaminated sediment to address the remaining risk.

MS-01

The Selected Remedy for MS-01 is Alternative MS01-03 (Dredging with Off-Yard Disposal), which was selected because it provides the best balance of tradeoffs with respect to the nine evaluation criteria. Alternative MS01-03 was selected over the other alternatives because it provides the greatest long-term effectiveness and will be protective of human health and the environment. Alternative MS01-03 will remove contaminated sediment to reduce concentrations of PAHs to cleanup levels, rather than relying on natural recovery to gradually decrease COC concentrations, as provided under Alternative MS01-02. Alternative MS01-03 is less implementable than Alternative MS01-02 and also has a greater cost, but the Selected Remedy is still readily implementable, and the additional costs are warranted because of the significantly greater protection provided in the long term.

The principal factors in the selection of this remedy for MS-01 were as follows:

- Removal of contaminated sediment will address potential unacceptable risks to benthic invertebrates without significant disturbance of the site or industrial site use and will allow unlimited use and unrestricted exposure.
- Removal of contamination to meet the RAO and cleanup levels will be conducted such that LUCs, O&M, monitoring, inspections, and five-year reviews are not required.
- The remedy provides greater confidence in achievement of the RAO in a shorter time and at an acceptably greater cost than Alternative MS01-02 ($917,661 compared with $311,538).

MS-03 and MS-04

The Selected Remedy for MS-03 and MS-04 is Alternative MS0304-03 (Dredging with Off-Yard Disposal), which was selected because it provides the best balance of tradeoffs with respect to the nine evaluation criteria. Alternative MS0304-03 was selected over the other alternatives because it provides the greatest long-term effectiveness and will be protective of human health and the environment. Alternative MS0304-03 will remove contaminated sediment to reduce concentrations of copper at MS-03 and copper and PAHs at MS-04 to cleanup levels, rather than relying on natural recovery to gradually decrease COC concentrations, as provided under Alternative MS0304-02. Alternative MS0304-03 is less implementable than Alternative MS0304-02 and also has a greater cost, but the Selected Remedy is still readily implementable, and the additional costs are warranted because of the significantly greater protection provided in the long term.

The principal factors in the selection of this remedy for MS-03 and MS-04 were as follows:

- Removal of contaminated sediment will address potential unacceptable risks to benthic invertebrates without significant disturbance of the site or industrial site use and will allow unlimited use and unrestricted exposure.
- Removal of contamination to meet the RAO and cleanup levels will be conducted such that LUCs, O&M, monitoring, inspections, and five-year reviews are not required.
- The remedy provides greater confidence in achievement of the RAO in a shorter time and at an acceptably greater cost than Alternative MS0304-02 ($745,410 compared with $323,481).

MS-12A and MS-12B

The Selected Remedies for MS-12A and MS-12B are MS12A-04 (Complete Removal with Off-yard Disposal) and MS12B-03 (Dredging with Off-Yard Disposal), respectively, which were selected because they provides the best balance of tradeoffs with respect to the nine evaluation criteria.

For MS-12A, Alternative MS12A-04 was selected over the other alternatives because it provides the greatest long-term effectiveness and will be protective of human health and the environment. Alternative MS12A-04 will remove contaminated sediment to reduce concentrations of lead and PAHs to cleanup levels, rather than relying on natural recovery to gradually decrease COC concentrations, as provided under Alternative MS12A-02. Contaminated sediment from the intertidal area inside Building 178 was already removed; therefore, placement and long-term O&M of a containment barrier, as provided under Alternatives MS12A-02 and MS12A-03 are no longer necessary. Alternative MS12A-04 is less implementable than Alternatives MS12A-02 and MS12A-03 and requires greater sediment removal, transport, and disposal than Alternative MS12A-03, but the Selected Remedy is still readily implementable. The additional cost of Alternative MS12A-04 compared to Alternative MS12A-02 is warranted because of the significantly greater protection provided in the long term.

The principal factors in the selection of this remedy for MS-12A were as follows:

- Removal of contaminated sediment will address potential unacceptable risks to benthic invertebrates without significant disturbance of the site or industrial site use and will allow unlimited use and unrestricted exposure.
- Removal of contamination to meet the RAO and cleanup levels will be conducted such that LUCs, O&M, monitoring, inspections, and five-year reviews are not required.
- The remedy provides greater confidence in achievement of the RAO in a shorter time and at an acceptably greater cost than Alternative MS12A-02 ($1,134,478 compared with $675,807), and the remedy achieves greater long-term effectiveness at a lesser cost than Alternative MS12A-03 ($1,134,478 compared with $1,601,353).

For MS-12B, Alternative MS12B-03 was selected over the other alternatives because it provides the greatest long-term effectiveness and will be protective of human health and the environment. Alternative MS12B-03 will remove contaminated sediment to reduce concentrations of lead to cleanup levels, rather than relying on natural recovery to gradually decrease COC concentrations, as provided under Alternative MS12B-02. Alternative MS12B-03 is less implementable than Alternative MS12B-02 and also has a greater cost, but the Selected Remedy is still readily implementable, and the additional costs are warranted because of the significantly greater protection provided in the long term.

The principal factors in the selection of this remedy for MS-12B were as follows:

- Removal of contaminated sediment will address potential unacceptable risks to benthic invertebrates without significant disturbance of the site or industrial site use and will allow unlimited use and unrestricted exposure.
- Removal of contamination to meet the RAO and cleanup levels will be conducted such that LUCs, O&M, monitoring, inspections, and five-year reviews are not required.
- The remedy provides greater confidence in achievement of the RAO in a shorter time and at an acceptable greater cost than Alternative MS12B-02 ($428,824 compared with $309,149).

MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14

No further action is the Selected Remedy because there are no unacceptable risks for these monitoring stations.

2.12.2 Description of Selected Remedies

The Selected Remedies for MS-01, MS-03, MS-04, and MS-12 (A and B) include three major components: (1) dredging of contaminated sediment, (2) dewatering of dredged sediment, and (3) transportation and disposal of dewatered and characterized sediment at an approved TSD facility. The remedial action documents will specify the requirements for dredging, dewatering, and disposal. Sampling will be conducted to make sure that contaminated sediment is removed such that the RAO and cleanup levels are met, and the remedial action documents will specify the requirements for sampling.

Contaminated sediment located offshore of PNS within the approximate areas shown on Figures 2-3 (MS-01), 2-4 (MS-03/MS-04), 2-5 (MS-12A), and 2-6 (MS-12B) will be removed to the specified depths to reduce concentrations of COCs to cleanup levels to meet the RAO. The estimated volume of in-place sediment requiring removal is approximately 1,800 cubic yards (cy) at MS-01, 1,300 cy at MS-03/MS-04, 600 cy at MS-12A, and 340 cy at MS-12B. The eelgrass bed on the ramp outside of Building 178 (see

Figure 2-5) is not within the removal limits because COC concentrations in sediment samples from the eelgrass bed are acceptable. Sediment removal will be conducted by dredging (e.g., mechanical or hydraulic). The dredging areas are located in a dynamic environment where sediment suspension and transport are the primary concern. BMPs will be implemented to prevent migration of resuspended sediment. Sediment suspension is addressed through selection of a dredging technology suited and operated to address environmental applications. Sediment transport will be minimized during remedial action through use of engineering controls (turbidity curtains). Sampling will be conducted to ensure the effectiveness of the sediment migration controls and that cleanup levels are met.

Dredged sediment will be dewatered and stabilized if needed using an additive to adsorb retained fluid. The dredged sediment will be characterized before transportation off yard for disposal at an approved TSD facility. The remedial action documents will specify the specific dredging technology, BMPs, sampling requirements, and dewatering and characterization activities for sediment removal and disposal. The removal of sediment contamination will be conducted such that LUCs, O&M, monitoring, inspections, and five-year reviews are not required.

Further action is not required to protect human health and the environment at MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14.

Excavation of contaminated sediment to meet cleanup levels at MS-01, MS-03, MS-04, and MS-12 (A and B), and No Further Action for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14 will result in no further risks associated with Site 5 and the OU4 AOCs. The monitoring stations and remedies associated with Site 5 and the AOCs area as follows.

AOC/Site	**Monitoring Station**	**Remedy**
Dry Dock/Site 5	MS-12 (A and B)	Sediment Removal
	MS-13, MS-14	No Further Action
Back Channel	MS-01	Sediment Removal
	MS-02	No Further Action
	MS-03, MS-04	Sediment Removal
Jamaica Cove	MS-05, MS-06	No Further Action
Clark Cove	MS-07, MS-08, MS-09	No Further Action
Sullivan Point	MS-10	No Further Action
DRMO Storage Yard	MS-11	No Further Action

Upon implementation of the final remedies for OU4, interim offshore monitoring will be discontinued.

FIGURE 2-3. MS-01 SELECTED REMEDY

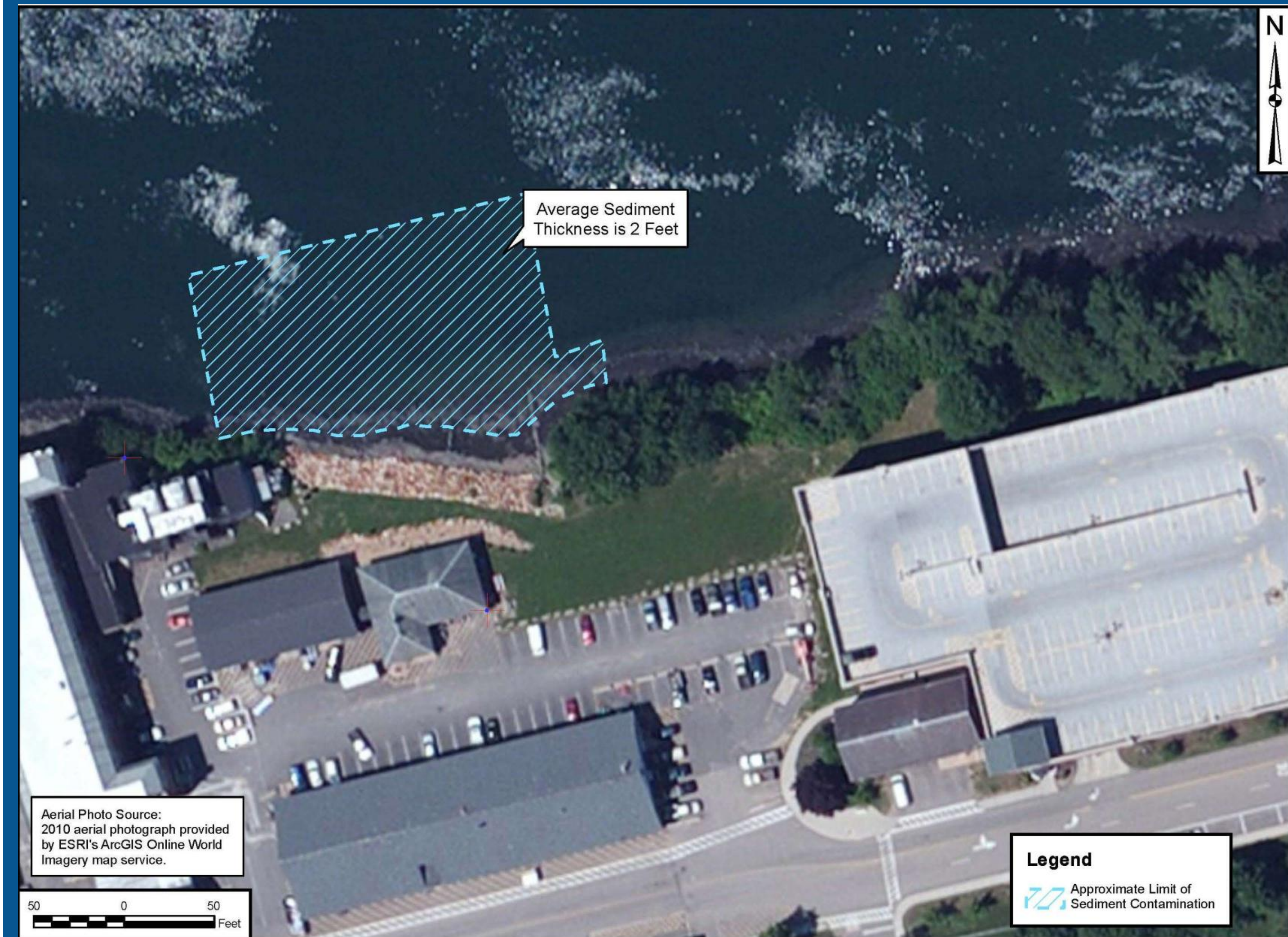


FIGURE 2-4. MS-03 AND MS-04 SELECTED REMEDY

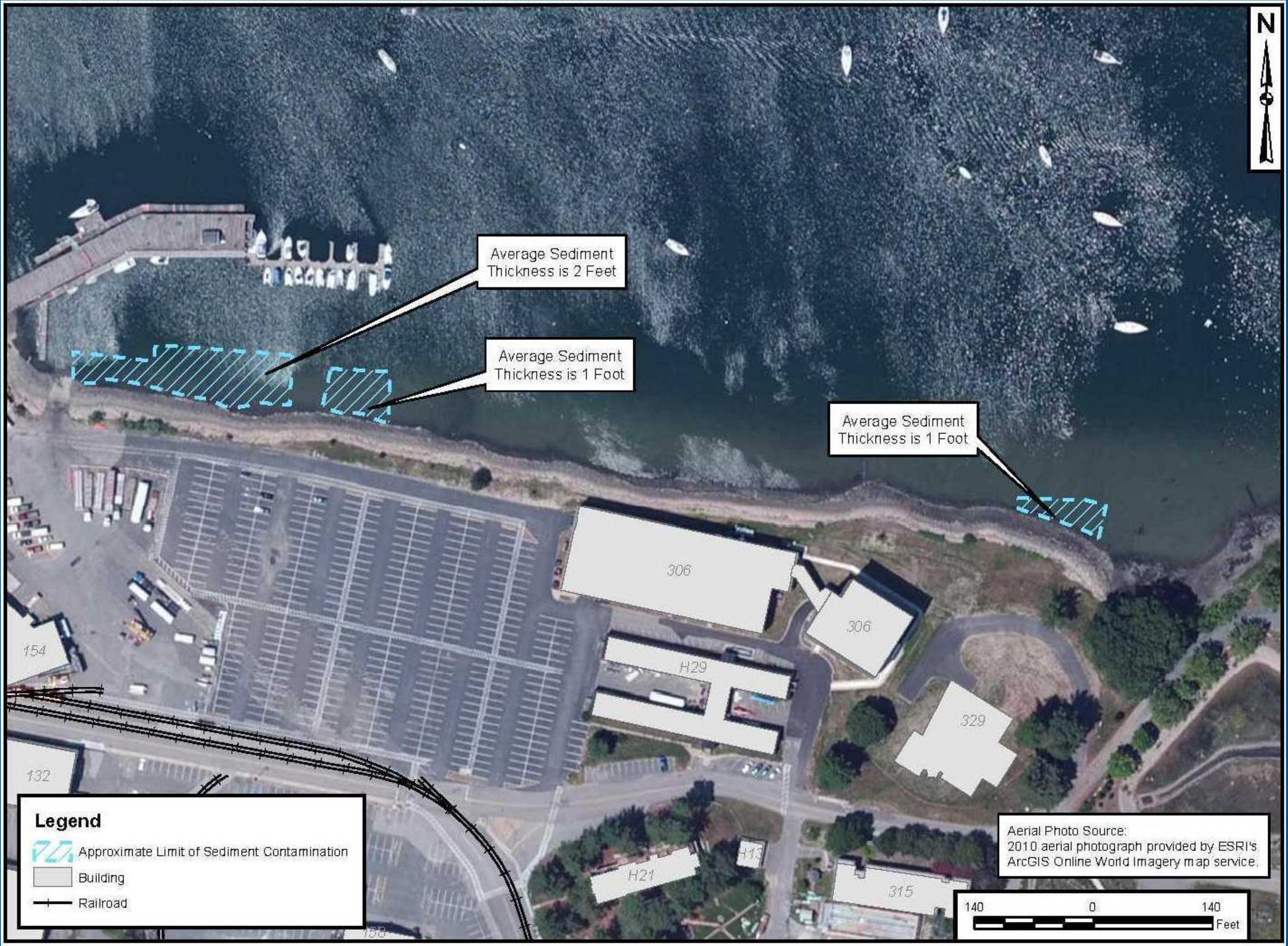
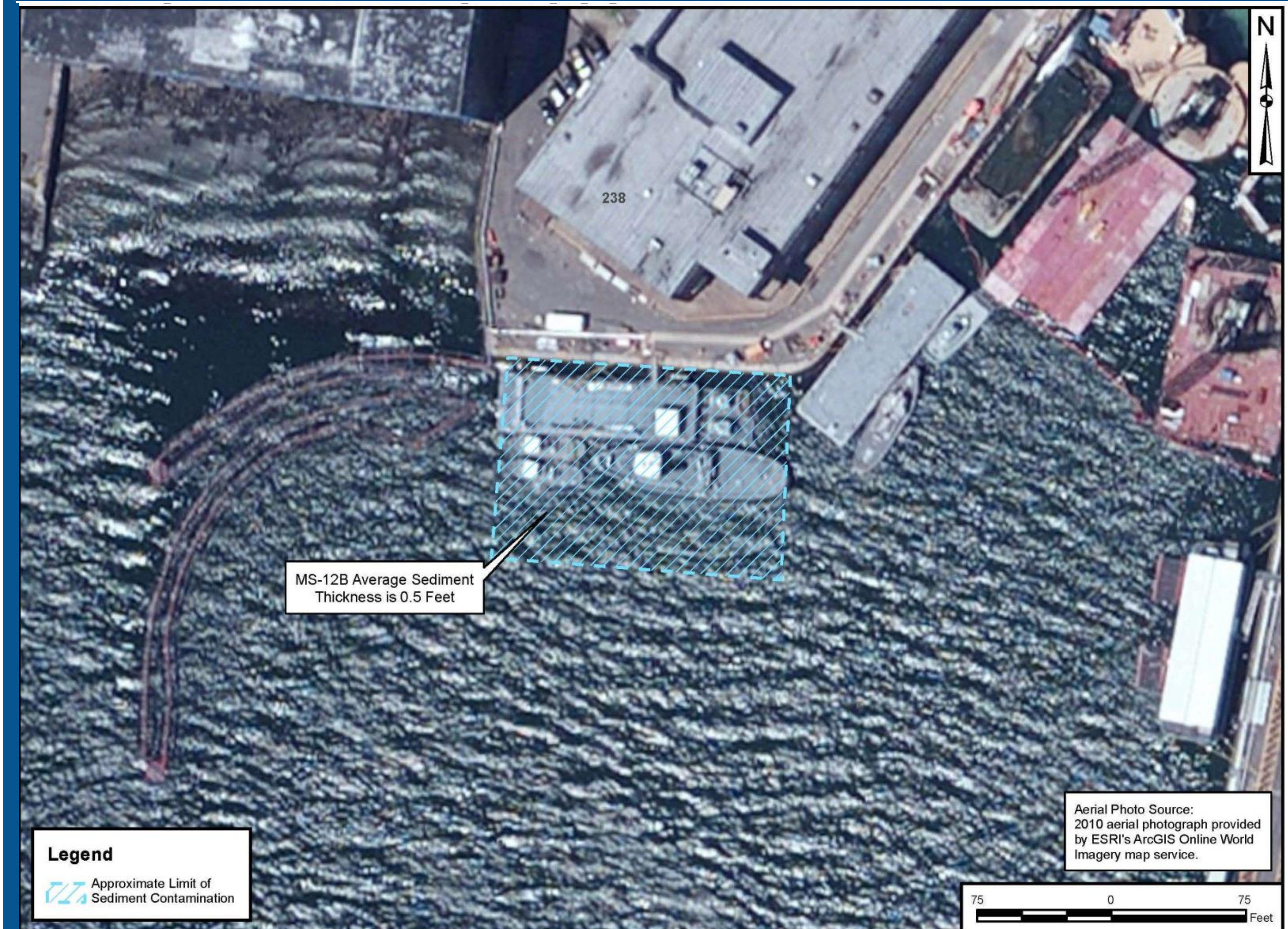


FIGURE 2-5. MS-12 SELECTED REMEDY – MS-12A

FIGURE 2-6. MS-12 SELECTED REMEDY – MS-12B



2.12.3 Expected Outcomes of Selected Remedies

The current and reasonably anticipated future plan is to continue to use the offshore areas of PNS for industrial purposes to support Shipyard mission activities. Under current conditions, exposure to sediment at OU4 is possible for various human and ecological receptors, but the risk to human receptors is acceptable. Current and reasonably anticipated future potential exposure pathways are expected to remain consistent with present exposure pathways. The sediment removal portions of the Selected Remedies for each monitoring station eliminate potentially unacceptable risks to benthic invertebrates.

It is estimated that the RAO for OU4 will be achieved immediately upon completion of the Selected Remedies, assuming that the remedial actions occur during a single mobilization at these areas. Including preparation of the required remedial action documents and implementation of the remedies, the RAO is expected to be achieved within approximately 15 months from initiation of the design and planning phase. Table 2-14 describes how the Selected Remedies mitigate unacceptable risk and achieve the RAO.

Excavation of contaminated sediment to meet cleanup levels at MS-01, MS-03, MS-04, and MS-12 (A and B), and No Further Action for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14 will result in no further risks associated with Site 5 and the OU4 AOCs, allowing unlimited use and unrestricted exposure across the entire OU4 area.

TABLE 2-14. HOW SELECTED REMEDIES FOR MS-01, MS-03, MS-04, AND MS-12 MITIGATE RISK AND ACHIEVE THE RAO

RISK	RAO	COMMENTS
Potential unacceptable risks to benthic invertebrates from exposure to contaminated sediment.	Eliminate unacceptable risk to ecological benthic receptors exposed to site-related COCs in suitable sediment habitats.	Dredging of contaminated sediment within the specified remedial areas at MS-01, MS-03, MS-04, and MS-12 (A and B) and off-yard disposal will reduce risk to acceptable levels for benthic invertebrates.

2.13 STATUTORY DETERMINATIONS

In accordance with the NCP, the Selected Remedies meet the following statutory determinations:

- **Protection of Human Health and the Environment** – The Selected Remedies for MS-01, MS-03, MS-04, and MS-12 are needed to prevent unacceptable risks to benthic invertebrates. Dredging of contaminated sediment will prevent unacceptable ecological exposure to contamination in the MS-01, MS-03, MS-04, MS-12A, and MS-12B areas. Further action is not required for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14 to protect human health and the environment.
- **Compliance with ARARs** – The Selected Remedies for OU4 will attain the identified federal and state ARARs, as presented in Appendix E.
- **Cost-Effectiveness** – The Selected Remedies are the most cost-effective alternatives with the greatest protection of human health and the environment that are expected to cause the least disruption of current facility operations. The costs are proportional to overall effectiveness by achieving an adequate amount of long-term effectiveness and permanence within a reasonable time frame. Detailed cost estimates for the Selected Remedies are presented in Appendix F.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Selected Remedies represent the maximum extent to which permanent solutions and alternative treatment technologies can be

used in a practical manner at OU4. Based on the heterogeneous mixture of organic and inorganic COCs (PAHs, copper, and lead) and their distributions across the site, the Navy concluded that it was impracticable to treat the COCs in a cost-effective manner. Sediment removal provides the best balance of tradeoffs for long-term effectiveness and permanence with ease of implementation for reasonable cost.

- **Preference for Treatment as a Principal Element** – Treatment is not a principal element of the Selected Remedies at OU4 because there are no principal threat wastes at the site.
- **Five-Year Review Requirement** – Five-year site reviews are not required for OU4 because contamination will not remain in excess of levels that allow for unlimited use and unrestricted exposure.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires that the ROD document and discuss the reasons for any significant changes made to the Selected Remedies presented in the Proposed Plan that was published for public comment. The Navy, in consultation with USEPA, determined that modifications to the Selected Remedies based on comments received during the public comment period were not required. Comments received during the public comment period are discussed in Section 3.0, Responsiveness Summary.

There were no significant changes made to the Selected Remedies from what was presented in the Proposed Plan (provided in Appendix B). However, based on completion of sediment removal to support the renovation project for Building 178, the area of sediment contamination shown for MS-12A in Figure 2-5 does not include the portion where sediment was removed. Appendix G provides additional information on the sediment removal as part of the renovation project.

3.0 RESPONSIVENESS SUMMARY

3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

Based on the results of the public comment period, no changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate. Participants in the public meeting held March 13, 2013, included two RAB members, the Technical Assistance Grant consultant for a community organization, and representatives of the Navy, USEPA, and MEDEP. One of the RAB members is a representative of the community organization that provided oral and written comments during the public comment period. Comments received during the public comment period are included in Appendix C. The community organization indicated general support for the preferred alternatives for OU4. One comment was specifically related to the preferred alternatives and is summarized in Table 3-1. Other comments and questions were in regard to consideration of factors that relate to future conditions at PNS and potential risks from migration of contamination from other OUs to the offshore area, which are being addressed as part of other OUs. The Navy responses to these comments and questions are provided in Appendix C.

TABLE 3-1. SUMMARY OF COMMENT ON PROPOSED REMEDIES FROM PUBLIC HEARING AND PUBLIC COMMENT PERIOD

COMMENT	RESPONSE
The community organization indicated that confirmation sampling was necessary to demonstrate that contamination has been removed at the four monitoring stations.	Sampling is included as discussed in the description of the preferred alternatives on page 16 of the Proposed Plan. The Navy will conduct sampling to make sure that contaminated sediment is removed such that the RAO and cleanup levels are met. The appropriate remedial action documents will specify the requirements for sampling at the four monitoring stations.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues associated with the OU4 ROD were identified.

Administrative Record Reference Table

DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

Item	Reference Phrase in ROD	Location in ROD	Location of Information in Administrative Record (N00102)	
			Record Number	Document Title
1	IAS	Table 2-1	000002	Initial Assessment Study of Portsmouth Naval Shipyard, Weston, June 1983
			000012 and 000013	Final Confirmation Study Report on Hazardous Waste Sites at Naval Shipyard Portsmouth, Loureiro Engineering Associates, June 1986
2	RCRA RFI	Table 2-1	000117 to 000122	Draft Acting as Final, RCRA Facility Investigation Report, McLaren/Hart, July 1992
			000169	Addendum to RCRA Facility Investigation Report, McLaren/Hart, June 1993
3	HHRA and Phase I/Phase II Offshore Data Comparison	Table 2-1	000229	Final Human Health Risk Assessment Report for Off-shore Media, McLaren/Hart, May 1994
			000606	Phase I/Phase II Offshore Data Comparative Analysis Report, Tetra Tech, October 1998
4	Interim ROD	Table 2-1	000676	Interim Record of Decision for Operable Unit 4, Navy, May 1999
5	EERA	Table 2-1	000838	Final Estuarine Ecological Risk Assessment, Naval Command, Control, and Ocean Surveillance Center, May 2000
6	Site 26 NFA	Table 2-1	001019	Decision Document for Site 26, Navy August 2001
7	Interim Offshore Monitoring for OU4	Table 2-1	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
			000750	Interim Offshore Monitoring Plan for Operable Unit 4, Tetra Tech, October 1999
			001062	Preliminary Remediation Goals for Operable Unit 4, Tetra Tech, November 2001
			001150	Baseline Interim Offshore Monitoring Report for Operable Unit 4, Tetra Tech, July 2002
			001416 and 001417	Rounds 1 through 7 Interim Offshore Monitoring Program Report, Tetra Tech November 2004

DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

ITEM	REFERENCE PHRASE IN ROD	LOCATION IN ROD	LOCATION OF INFORMATION IN ADMINISTRATIVE RECORD (N00102)	
			RECORD NUMBER	DOCUMENT TITLE
	Interim Offshore Monitoring for OU4 (continued)		001484	Additional Scrutiny Quality Assurance Project Plan for Operable Unit 4, Tetra Tech, August 2005
			001612	Additional Scrutiny Report for Operable Unit 4, Tetra Tech, August 2007
			001619	Phase II Additional Scrutiny Quality Assurance Project Plan, Tetra Tech, September 2007
			001682	Draft Acting as Final Technical Memorandum Recommendation for Modifications to the Interim Offshore Monitoring Program, Tetra Tech, September 2008
			001716	Rounds 1 through 10 Interim Offshore Monitoring Program Report for Operable Unit 4, Tetra Tech, February 2010
			002514	Interim Offshore Monitoring Plan for Operable Unit 4, Revision 1, Tetra Tech, November 2010
			002697	Second Five-Year Review Report for PNS, Tetra Tech, May 2012
8	FS and cleanup alternatives	Table 2-1	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
9	Site Characteristics	Section 2.5	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
			002697	Second Five-Year Review Report for PNS, Tetra Tech, May 2012
10	Human health risk	Table 2-1 and Section 2.7.1	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
			000229	Final Human Health Risk Assessment Report for Offshore Media, McLaren/Hart, May 1994)
			000606	Phase I/Phase II Offshore Data Comparative Analysis Report, Tetra Tech, October 1998)
			002465	Final Public Health Assessment NSY Portsmouth, Agency for Toxic Substances and Disease Registry, November 2007

DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

Item	Reference Phrase in ROD	Location in ROD	Location of Information in Administrative Record (N00102)	
			Record Number	Document Title
11	Ecological risk	Section 2.7.2	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
			000838	Final Estuarine Ecological Risk Assessment, Naval Command, Control, and Ocean Surveillance Center, May 2000
12	Remedial action objectives and cleanup levels	Section 2.8	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
			001062	Preliminary Remediation Goals for Operable Unit 4, Tetra Tech, November 2001
14	Preliminary technology/screening	Section 2.9	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
15	Remedial alternatives	Section 2.9	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
16	Nine CERCLA evaluation criteria	Section 2.10	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
17	Chemical-, location-, and action-specific ARARs	Section 2.10	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
18	Public meeting	Section 3.1	Not Applicable	The public meeting for the Proposed Plan for OU4 was held on March 13, 2013. Transcripts are provided in Appendix C.

Appendix A
State of Maine Concurrence Letter

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
ACTING COMMISSIONER

August 5, 2013

James T. Owens, I11
Director, Office of Site Remediation & Restoration EPA New England, Region I
5 Post Office Sq. Suite 100
Mail Code OSRR07-5
Boston, MA 02109-3912

Re: Record of Decision for Operable Unit 4
Portsmouth Naval Shipyard, Kittery, Maine

Dear Mr. Owens:

The Maine Department of Environmental Protection (MEDEP) has reviewed the Record of Decision – Operable Unit 4 – Site 5 and Offshore Areas Potentially Impacted by PNS Onshore IRP Sites, Portsmouth Naval Shipyard, Kittery, Maine dated August 2013. The Record of Decision (ROD) summarizes the results from the Human Health Risk Assessment, Estuarine Ecological Risk Assessment, Interim Offshore Monitoring and the Feasibility Study and documents Navy's rationale for selecting removal of contaminated sediment and disposal of the sediments off-yard for MS-01, MS-03, MS-04, MS-12, and no further action for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14. MEDEP concurs with the selected decision for contaminated sediments of sediment removal and disposal off-site and no further action for sediments without contaminants exceeding cleanup levels.

The State's concurrence of the selected decision, as described above, should not be construed as the State's concurrence with any conclusion of law or finding of fact, which may be set forth in the ROD or supporting documents for the site listed above. The State reserves any and all rights to challenge any such finding of fact or conclusion of law in any other context.

This concurrence is based on the State's understanding that the Navy will continue to solicit MEDEP's review and concurrence with the Remedial Design, Remedial Action oversight, and Remedial Action report for OU4.

MEDEP looks forward to working with the Department of the Navy and Environmental Protection Agency to resolve the environmental issues remaining at the Portsmouth Naval Shipyard. If you have any questions or comments, please contact Iver McLeod at iver.j.mcleod@maine.gov or 207-287-8010.

Best regards,

Patricia W. Aho

Patricia W. Aho
Commissioner

pc: Iver McLeod – MEDEP
Elizabeth Middleton – US Navy
Matt Audet - USEPA

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04679-2094
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

Appendix B
Proposed Plan for Operable Unit 4

Proposed Plan

Operable Unit 4

Portsmouth Naval Shipyard, Kittery, Maine

THE CLEANUP PROPOSAL

This Proposed Plan has been prepared, in accordance with federal law and the Federal Facility Agreement for Portsmouth Naval Shipyard (PNS), to present the Navy's preferred approach for addressing contaminated sediment at Operable Unit (OU) 4, PNS, Kittery, Maine. OU4 includes Site 5 – the Former Industrial Waste Outfalls and six areas of concern (AOCs). Past contamination from Site 5 is addressed as part of the Dry Dock AOC. Monitoring stations (labeled MS-01 to MS-14) provide coverage of the offshore AOCs and the remedial alternatives for OU4 were evaluated for the monitoring stations or for groups of nearby monitoring stations.

After careful study, the Navy, with concurrence from the United States Environmental Protection Agency (EPA), proposes to remove contaminated sediment and dispose of the sediments off-yard for MS-01, MS-03, MS-04, MS-12, and proposes no further action for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14. With the implementation of final remedies at OU4, interim offshore monitoring will be discontinued.

This plan provides information on the remedial alternatives evaluated for impacted sediment, the public comment period, the public informational open house and public hearing, and how the final remedy for OU4 will ultimately be selected.

LET US KNOW WHAT YOU THINK

Mark Your Calendar!

PUBLIC COMMENT PERIOD

FEBRUARY 27, 2013 TO MARCH 28, 2013

The Navy will accept comments on this Proposed Plan for OU4 during this comment period. You do not have to be a technical expert to comment. To provide formal comments, you may offer oral comments during the public hearing or provide written comments at the informational open house, at the public hearing, or by fax or mail. Send written comments postmarked no later than March 28, 2013, to:

Ms. Danna Eddy, Public Affairs Office (Code 100PAO),
Portsmouth Naval Shipyard,
Portsmouth, New Hampshire 03804-5000

Fax: (207) 438-1266

INFORMATIONAL OPEN HOUSE AND PUBLIC HEARING

MARCH 13, 2013

The Navy invites you to attend an informational open house from 7:45 pm to 8:15 pm to learn more about the proposed OU4 cleanup plan and how it compares with other cleanup options for the site. The informational session will include posters describing the Proposed Plan, and an informal question and answer session. A formal public hearing will follow from 8:15 to 8:45 pm, in which the Navy will receive comments on the Proposed Plan from the public. It is at this formal hearing that an official transcript of the comments will be recorded. The above activities will be held at the *Kittery Town Hall in Kittery, Maine*.

Federal and state environmental laws govern cleanup activities at federal facilities. A federal law called the ***Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)****, better known as Superfund, provides procedures for investigation and cleanup of environmental problems. Under this law, the Navy is pursuing cleanup of designated sites at PNS to return the property to a condition that protects the community, workers, and the environment.*

TECHNICAL TERMS USED THROUGHOUT THIS PROPOSED PLAN ARE EXPLAINED IN THE GLOSSARY OF TERMS ON PAGE 20

INTRODUCTION

This Proposed Plan provides information on the preferred approaches for addressing contaminated sediment at OU4 and provides the rationale for this preference. In addition, this plan includes summaries of other cleanup alternatives evaluated for use at OU4. This document is issued by the Navy, as the lead agency for all investigation and cleanup programs ongoing at PNS, and EPA, with the concurrence of the Maine Department of Environmental Protection (MEDEP). The Navy and EPA, in consultation with MEDEP, will select the final remedies for OU4 after reviewing and considering all information submitted during the 30-day public comment period and may modify the preferred alternatives or select another response action presented in this plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this Proposed Plan.

The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**. The Proposed Plan summarizes information that can be found in greater detail in the Rounds 1 through 10 Interim Offshore Monitoring Program Report, the **Feasibility Study (FS)** Report for OU4, and other documents included in the PNS Information Repositories, located at the Rice Public Library in Kittery, Maine, and the Portsmouth Public Library in Portsmouth, New Hampshire. Documents are also available on the Navy's public website for PNS. The Navy and EPA encourage the public to review these documents to gain a more comprehensive understanding of the site and associated environmental activities. Please refer to the Next Steps section on Page 19 for location and contact information for these facilities.

The purposes of this Proposed Plan are to:

- Provide the public with basic background information about PNS and OU4. This information includes a description of the operable unit that was developed by reviewing past documents, investigating offshore media (surface water, sediment, and biota), and evaluating potential human and ecological impacts.
- Describe the cleanup options that were considered.
- Identify the Navy's preferred alternatives for remedial action at OU4 and explain the reasons for that preference.
- Provide the public information on how the public can be involved in the remedy selection process.
- Solicit and encourage public review of the Proposed Plan.

History of Site Investigations and Interim Actions

1983 through 1986 – Initial Assessment Study (IAS): Assessed and identified potential threats posed by the sites to human health and the environment. The final stage of this investigation was completed in 1986 with the release of the Final Confirmation Study (FCS). The FCS was conducted to evaluate the sites specified in the IAS to confirm the presence of contamination.

1989 through 1995 – Resource Conservation and Recovery Act (RCRA) Facilities Investigation (RFI): Consisted of several stages from October 1989 to February 1992 with the results compiled into the **RFI Report**. EPA issued the RFI "Approval with Conditions" in March of 1993, and the Addendum to the RFI Report was assembled to address the "Approval with Conditions." The RFI Data Gap Report, compiled in 1995, is supplemental to the RFI Report and presents the results of the field work.

1994 - The Human Health Risk Assessment (HHRA) and 1998 Phase I/Phase II Offshore Data Comparison: Potential exposure points and routes identified for human health included dermal contact with and ingestion of surface water and sediment, and ingestion of biota (lobster, mussels, and flounder) for the PNS offshore area. The results were used to evaluate human health risks for the offshore area.

1999 – Interim Record of Decision (ROD) for OU4: Required the Navy to conduct monitoring for the offshore area of PNS in the interim period before the FS is completed for the offshore area, and until the final remedy for OU4 is implemented.

2000 – Estuarine Ecological Risk Assessment (EERA): Sediment, surface water, and tissue samples were collected from the offshore area for various analyses/studies. The results of the analyses/studies were used to evaluate ecological risks for the offshore area.

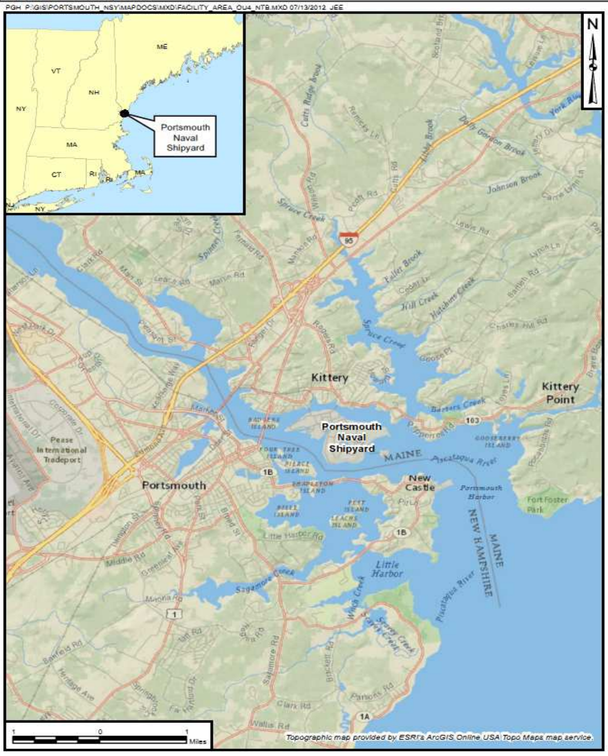
2001 – Preliminary Remediation Goals (PRGs) for OU4: Identified risk-based chemical concentrations in sediment that are protective of sediment invertebrates.

1999 through 2011 – Interim Offshore Monitoring for OU4: A monitoring plan was developed and 11 rounds of sampling plus two additional scrutiny investigations were conducted from September 1999 through April 2011. The data from Rounds 1 through 4 were evaluated in the Baseline Report in 2002, and data from Rounds 1 through 7 were evaluated in the Rounds 1 through 7 Report in 2004. The data from the Phase I Additional Scrutiny Investigation were evaluated in the 2007 Additional Scrutiny Report. Data from Rounds 1 through 10 and the Phase II Additional Scrutiny Investigation were compiled and evaluated in the Rounds 1 through 10 Interim Monitoring Program Report in 2010. Data from Round 11 were evaluated in the Second Five-Year Review Report.

2012 – Feasibility Study (FS): Conducted to develop and evaluate potential cleanup alternatives for OU4.

Figure 1 - Vicinity Map

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\FACILITY_AREA_OU4_NTB.MXD 07/13/2012 JEE



After the public has had the opportunity to review and comment on this Proposed Plan, the Navy will summarize and respond to all significant comments received during the comment period in a Responsiveness Summary. The Navy and EPA, in consultation with MEDEP, will carefully consider all comments received and could even select remedies different from that proposed in this plan after appropriate additional opportunity for comment. Ultimately, the selected remedies for OU4 will be documented in a **Record of Decision (ROD)** for the site. The Responsiveness Summary will be issued with the ROD.

Site Background

PNS is a military facility with restricted access located on an island in the Piscataqua River. The Piscataqua River is a tidal estuary that forms the southern boundary between Maine and New Hampshire. PNS was established as a government facility in 1800, and served as a repair and building facility for ships during the Civil War. The first government-built submarine was designed and constructed at PNS during World War I. A large number of submarines have been designed, constructed, and repaired at this facility since 1917. PNS continues to service submarines as its primary military focus. Figure 1 shows the location of PNS, and Figure 2 shows the layout of PNS and OU4.

Where is OU4 within the Shipyard?

OU4 is the offshore area of the Piscataqua River and Back Channel around PNS potentially impacted by onshore IRP sites and Site 5 (former industrial waste outfalls). OU4 is a compilation of Site 5 and six AOCs. The AOCs are nearshore habitats adjacent to PNS that may have been affected by onshore Installation Restoration Program (IRP) sites. The six AOCs are: Clark Cove, Sullivan Point, Defense Reutilization and Marketing Office (DRMO) Storage Yard, Dry Docks, Back Channel, and Jamaica Cove. The AOC locations are shown on Figure 2. The conceptual site model of OU4 is shown on Figure 3.

Two IRP sites were considered sites that had offshore impacts but no onshore impacts: Site 5, Former Industrial Waste Outfalls; and Site 26, Portable Oil/Water Tanks. A No Further Action document was signed for Site 26; therefore, it is no longer included in OU4. Site 5 consisted of numerous discharge points along the Piscataqua River at the western end of PNS in the Dry Docks AOC. Use of these outfalls was discontinued in 1975. Past contamination from Site 5 is being addressed by the monitoring stations within the Dry Dock AOC.

As part of the Interim Offshore Monitoring Program, 14 monitoring stations were identified to provide coverage of the offshore AOCs for interim monitoring purposes. Four reference stations located in the Piscataqua River were also sampled to provide information about non-PNS impacted areas.

MS-01, MS-02, MS-03, and MS-04 are located in the Back Channel AOC. MS-01 is located in the western portion of the AOC, offshore of Site 34 (OU9) and adjacent to the bridge leading to Gate No. 1. Past disposal of ash at Site 34 is the likely source of elevated **polycyclic aromatic hydrocarbons (PAHs)** at OU9. Removal of the ash as part of the 2007 Site 34 removal action eliminated the IRP source of contamination at this station.

MS-02 is located between Topeka Pier and the bridge from Gate No. 2. There are no known IRP sites immediately onshore of MS-02. MS-03 and MS-04 are located in the eastern portion of the AOC, offshore of Site 32 (OU7). Foundry slag associated with fill material at Site 32 has been identified in the intertidal areas of MS-03 and MS-04, and is likely the source of elevated **metal** and PAH concentrations at those stations. Removal of surficial debris in the intertidal area and placement of shoreline erosion controls as part of the 2006 Site 32 removal action eliminated the IRP source of contamination to these monitoring stations.

MS-05 and MS-06 are located in the offshore area of OU3 in Jamaica Cove, and are adjacent to the wetland constructed as part of the remedy for OU3. As part of the remedy for OU3, contaminated soil adjacent to Jamaica Cove was excavated, and wetlands were constructed in the excavated area. Although there is no longer contaminated soil adjacent to Jamaica Cove, the excavation of contaminated soil resulted in the release of contaminants to sediment offshore of Jamaica Cove.

MS-07, MS-08, and MS-09 are all located in the Clark Cove AOC. MS-07 is located in a recreational area of the AOC, but is not immediately offshore of OU3. There are no known IRP sites immediately onshore of MS-07. MS-08 and MS-09 are located immediately offshore of OU3 in the AOC. The intertidal area near MS-08 was excavated as part of the OU3 remedial activities in 2004, and the excavated area was backfilled with clean material. As part of OU3 remedial activities, shoreline erosion controls were installed in the small intertidal areas that existed at MS-09 and the area was covered with riprap; therefore, there is no longer an intertidal area associated with MS-09.

MS-10 is located at the southeastern corner of PNS, within the Sullivan Point AOC. It is the only monitoring station in this area, and no previous activity is suspected to have led to contamination. There are no known IRP sites immediately onshore of MS-10.

MS-11 is located within the DRMO Storage Yard AOC. MS-11 is located in the main channel of the Piscataqua River, just offshore of OU2 (Sites 6 and 29). Past DRMO and waste disposal activities led to soil contamination at OU2. Physical movement of contaminated soil, such as snow plowing and erosion of contaminated soil, have resulted in contamination of the offshore area adjacent to OU2 in the past. Current erosion of contaminated soil is not occurring because of controls placed along the shoreline (in 1999 along Site 6 and in 2005, 2006, and 2008 along Site 29).

MS-12, MS-13, and MS-14, are located in the western section of PNS in the Dry Docks AOC. MS-12 is located adjacent to Building 178 and offshore of Sites 5 and 10. One likely source of contamination in the area is a former industrial waste outfall (Site 5) that reportedly discharged material during previous operations. There are no current IRP sources to MS-12. Other potential Navy sources of contamination exist at MS-12, including potential migration or transport from IRP sites or various boat, barge, and dock-side activities. MS-13 is located outside of a dry dock offshore of Sites 5 and 31. MS-14 is located in the westernmost part of the back channel to monitor sediment potentially impacted by Sites 5 and 31.

Figure 2 - Overview of Interim Offshore Monitoring Station Locations

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\PORTSMOUTH_MS_SITES_NTB.MXD 09/24/12 JEE

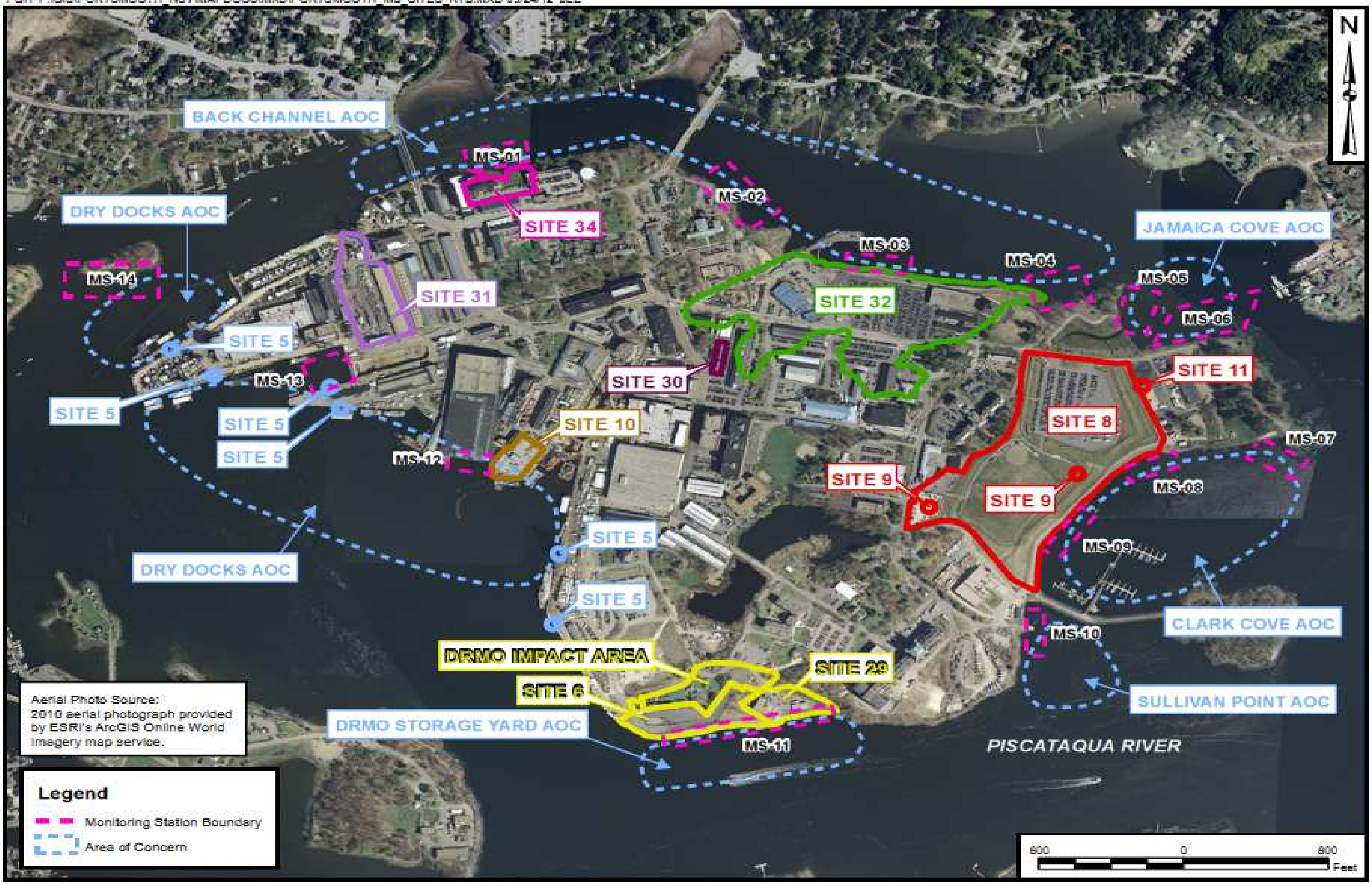
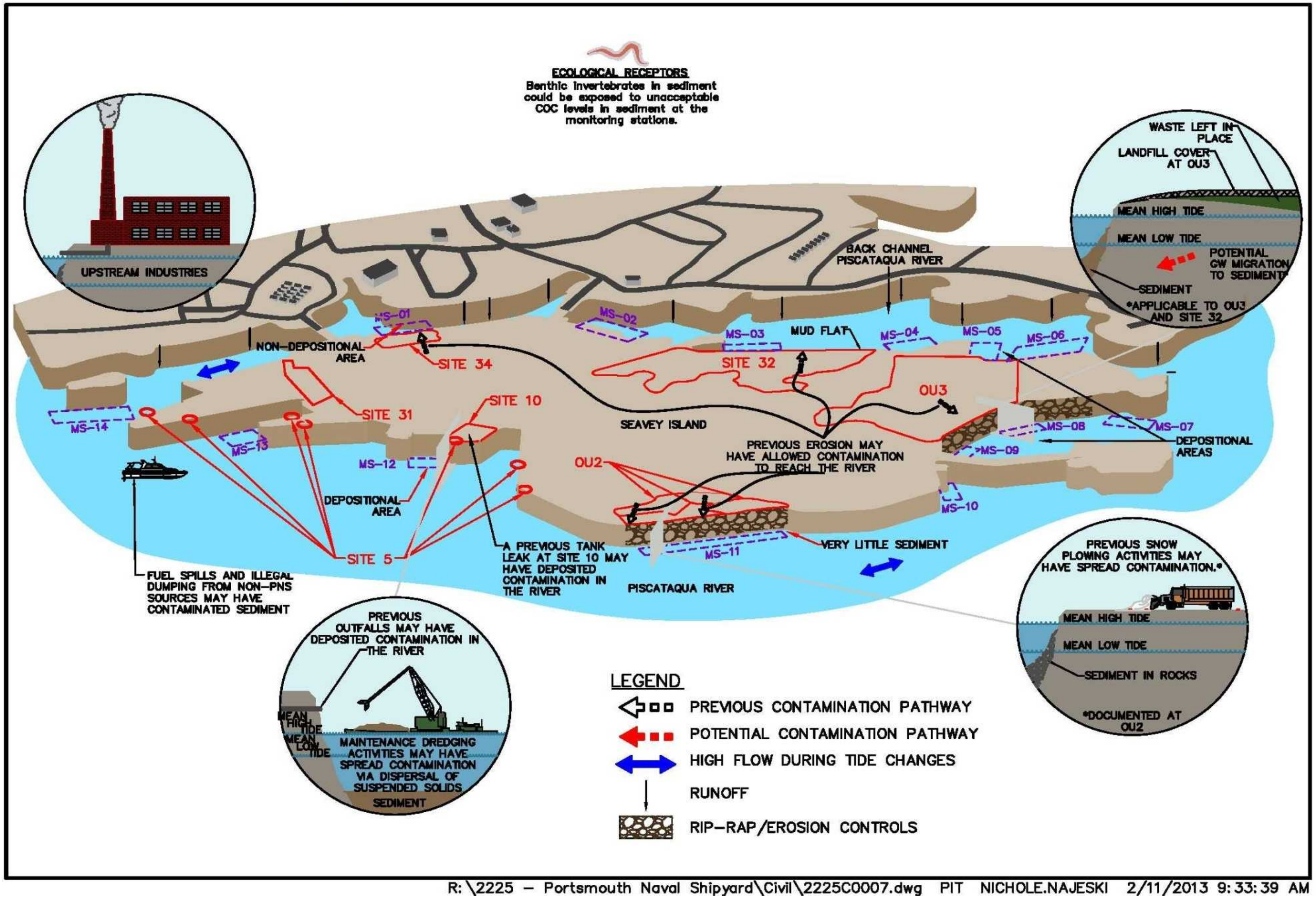


Figure 3 - Conceptual Site Model



For what was OU4 used?

The Shipyard uses the offshore area for boat docks and piers as well as for vessel transport as part of Shipyard operations. The Piscataqua River and Back Channel near PNS are also used for non-Navy activities including commercial and recreational boat traffic and discharge from municipal and industrial operations or treatment plants.

What is the current and future land use at the site?

OU4 is the area offshore of PNS; therefore, its uses would be those that occur in the Piscataqua River. Current uses of the Piscataqua River include commercial and recreational activities such as boating, fishing, and lobstering. Future uses are expected to remain the same.

Site Characteristics

What does OU4 look like?

In OU4, the offshore area of PNS, there are boat docks, piers, and various habitats, including wetlands, mudflats, rocky bottoms, eelgrass, and salt marsh. The different habitats support a diverse group of floral and faunal species such as phytoplankton, algae, and eelgrass; along with invertebrates such as mussels and lobsters, birds such as gulls and herons, and mammals such as raccoons and mink, to name a few.

The channel bottom/subtidal habitat is the bottom of the pelagic area and consists of both hard-bottom areas and fine-grained depositional areas. The hard-bottom areas occur where the river experiences tidal scouring and active erosion, such as in those areas offshore of PNS in the main flow of the Piscataqua River. The fine-grained depositional areas occur outside the main flow of the Piscataqua River, along the Back Channel, Jamaica Cove, and Clark Cove.

What is the size of OU4?

OU4 comprises the area offshore of PNS, represented by the 14 monitoring stations. The combined area of the monitoring stations is approximately 19 acres.

How much and what types of chemicals are present?

The **chemicals of concern (COCs)** detected in sediment samples collected at OU4 are discussed in this section. The discussion focuses on the monitoring stations, because most sediment samples were collected at these stations as part of the Interim Offshore Monitoring Program or other offshore investigations, and the COCs vary across the monitoring stations. Based on the interim offshore monitoring program results, **PAHs** and **metals** are the COCs in the offshore sediment.

The monitoring program showed that concentrations of COCs at MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-13, and MS-14 were less than levels that indicate an ecological risk.

For MS-11, copper, lead, and nickel are the COCs that resulted from past erosion of soil from the OU2 shoreline. With the installation of shoreline erosion controls, erosion is no longer occurring along the OU2 shoreline. The offshore area of OU2 is rocky and there is a minimal amount of fine-grained sediment at MS-11; therefore, there is not sufficient sediment to cause ecological risk. In the one location where a small amount of sediment was found, concentrations of copper, lead, and nickel exceeded ecological risk levels in two to six of the seven sampling rounds prior to installation of the shoreline erosion controls. Concentrations of the COCs were less than ecological risk levels in the one round of sampling at MS-11 conducted after placement of the shoreline erosion controls (Round 11).

At MS-01, PAHs are the primary COCs and likely resulted from past erosion of ash from past operations at nearby Building 62 at OU9. Assuming an average sediment thickness of 2 feet, the volume of contaminated sediment with COCs at concentrations that present a potential ecological risk is about 1,800 cubic yards (yd^3).

For MS-03 and MS-04, the COCs are copper and PAHs, which are associated with past erosion of fill material located in the onshore area (OU7) adjacent to these monitoring stations. Assuming an average sediment thickness of 1 to 2 feet (depending on the area), the volume of contaminated sediment with COCs at concentrations that present a potential ecological risk is about 1,300 yd^3.

At MS-12, the COCs are lead and PAHs. One likely source of these chemicals is a former industrial waste outfall (Site 5) that reportedly discharged metals (including lead) and PAHs during previous operations. The discharges were discontinued by 1975. Therefore, there are no current IRP sources to MS-12. Other potential Navy sources of the elevated levels of lead and PAHs at MS-12 include: potential migration or transport from IRP sites, discharges from barges/boats, discharges from storm water outfalls located in the vicinity of the Shipyard, and dock-side activities. Based on the distribution of COCs, MS-12 was divided into MS-12A and MS-12B. MS-12A is located adjacent to Building 178 and includes a portion of Building 178 where water enters the building in the former boat bays. At MS-12A, assuming an average sediment thickness of 1.5 feet outside of Building 178, the volume of contaminated sediment with lead and PAHs at concentrations that present ecological risks is about 1,585 yd^3, while the volume of contaminated sediment inside Building 178 is about 150 yd^3, assuming an average sediment thickness of 0.2 feet. MS-12B is located offshore of a Site 5 outfall and only has lead contamination. At MS-12B, assuming an average sediment thickness of 0.5 feet, the volume of contaminated sediment with lead at concentrations that present an ecological risk is about 340 yd^3.

There are several potential non-Navy contaminant sources to the Piscataqua River offshore of PNS, especially sources of metals and petroleum products, because this area has a large amount of industry and urbanization. For example, potential sources include local industries, urban non-point source runoff, municipal water treatment discharges, and fuel or oil terminals. Petroleum products (e.g., fuel oil, diesel fuel, tar, etc.) and the incomplete combustion products of fuels from deposition on impervious industrial areas outside the Shipyard facility can be sources of metals and PAHs and may migrate offshore via sheet flow or storm sewers. Also, boat traffic in the river is a potential source of PAHs to the offshore area.

Scope and Role of the OU4 Response Action

OU4 is one of several operable units at PNS identified for assessment and cleanup under CERCLA. Each of these operable units is undergoing the CERCLA cleanup process independently of each other. The Proposed Plan for OU4 is not expected to have an impact on the strategy or progress of cleanup for the other sites at PNS. As these other sites (OU7, OU8, and OU9) progress through the cleanup process, Proposed Plans will be issued for these sites. Proposed Plans have already been prepared and RODs have been signed for OU1, OU2, and OU3.

Summary of Risks

As part of site investigation activities, the Navy completed human health and ecological risk assessments to evaluate current and future effects of chemicals detected at OU4 on human health and the environment. The results of these assessments are described below.

Human Health Risks

The **HHRA** evaluated potential exposure to contaminants in sediment and surface water across OU4. It did not evaluate risks individually at each AOC or monitoring station. The risk assessment was conducted in accordance with EPA guidance documents that were available at the time.

Based on the results of the HHRA, risks for ingestion of sediment, dermal contact with sediment, ingestion of surface water, and dermal contact with surface water were less than regulatory guidelines. Based on studies within the Piscataqua River, concentrations of chemicals in seafood causing potentially unacceptable risks around PNS were generally similar to or less than concentrations in background samples or in other coastal waters of Maine. Although the potential risks for ingestion of seafood around PNS exceeded regulatory guidelines, the Agency for Toxic Substances and Disease Registry (ATSDR) Public Health Assessment (PHA) for PNS concluded that adults and children consuming fish or shellfish, or wading in the surface water and sediment are not likely to experience adverse health effects from the levels of chemical in those media. For these reasons, human health risks were found to be acceptable and human health was not considered in the FS. No monitoring station locations require remedial action based on human health risks.

To estimate the baseline risk for humans using the HHRA methodology, a four-step process was used.

Step 1 – Identify COPCs

COPCs are chemicals found at the site at concentrations greater than state and/or federal risk-based screening criteria and background levels. The COPCs were further evaluated in Steps 2 through 4 of the risk assessment.

Step 2 – Conduct an Exposure Assessment

In this step, ways that humans come into contact with sediment, surface water, and biota at OU4 are considered. Both current and reasonably foreseeable future exposure scenarios were identified. Human receptors evaluated at OU4 included recreational and subsistence fishermen exposed to chemicals in the surface water, sediment, and biota.

Step 3 – Complete a Toxicity Assessment

In this step, possible harmful effects from exposure to the individual COPCs are evaluated. Generally, these chemicals are separated into two groups: carcinogens (chemicals that may cause cancer) and non-carcinogens (chemicals that may cause adverse effects other than cancer).

Step 4 – Characterize the Risk

The results of Steps 2 and 3 were combined to estimate the overall risk from exposure to chemicals at OU4.

Ecological Risks

The primary objective of the ecological risk assessment was to evaluate whether ecological receptors are potentially at risk when exposed to chemicals at OU4. The **EERA** began with problem formulation. Detailed ecological studies were then conducted to evaluate chemical exposure levels and assess ecological effects in the estuary. Finally, risk characterization was conducted by evaluating data and information from the ecological studies for evidence of ecological risk.

Step 1 – Problem Formulation

Within problem formulation, contaminants of ecological concern, assessment endpoints, and exposure pathways were identified. A conceptual model describing how contaminants from PNS could affect ecological resources in the estuary was also developed in this step. Assessment endpoints are the components of the ecosystem that are to be protected in the study area. They represent the environmental processes or conditions that can be assessed to determine if there are ecological impacts present. Assessment endpoints were identified by defining the COPCs, ecological effects, and the ecosystems at risk.

To relate exposure levels to potential effects and to the assessment endpoints for the EERA, receptors of concern (species or communities of species that can be evaluated at the site) in the Great Bay Estuary were identified for each assessment endpoint. Receptors of concern were selected to meet one or more of the following criteria: the importance of the receptor to the ecology of the estuary, its sensitivity to COPCs associated with the Shipyard, and its aesthetic, recreational, and/or commercial importance as a natural resource of the estuary. The receptors of concern were considered to be surrogate or indicator receptors for larger groups of species.

Step 2 – Risk Analysis

In this step, possible harmful effects from being exposed to the individual COPCs were evaluated. Two types of information are required to characterize ecological risk, data on the chemical exposure in environmental media (surface water and sediment), and data that relate exposure levels (dose) to measurable ecological effects. Measurements of COPC concentrations in water, sediment, and tissues of estuarine organisms, and measurements of the health and status of ecological receptors were conducted in the AOCs and in reference areas to evaluate ecological risk. Exposure and effect data obtained for each AOC were used to evaluate the potential impact from the Shipyard relative to other areas in the lower estuary. The COCs were identified from the COPCs as the chemicals that had an indication of being at harmful levels in the estuary.

Step 3 – Risk Characterization

In this step, the results of the risk analysis were analyzed to determine the likelihood of harmful effects to ecological receptors at OU4. Based on the risk characterization, the general conclusions were that the contaminants from onshore PNS sites were released to the offshore area by erosion, runoff, and groundwater discharge. Some contaminants were also directly discharged to these offshore locations. The primary receptors of concern for this offshore contamination are benthic invertebrates.

A weight-of-evidence approach was then used to evaluate measures of effect and measures of exposure to interpret the level of risk evident for each applicable assessment endpoint and AOC. No single measure alone is capable of determining whether there is risk or not; therefore, multiple lines of evidence were developed to characterize the magnitude of risk. Overall, the EERA did not detect severe impacts. Although there were indications of intermediate risk from sediment exposure in some AOCs, the assessment showed that most of the estuarine habitats around the Shipyard were healthy and productive.

Estuarine Ecological Risk Assessment for PNS

The **EERA** was completed to provide an assessment of the potential adverse environmental effects from past discharges of contaminants from PNS to the offshore environments of the Piscataqua River and Great Bay Estuary. The EERA was conducted in two phases. Phase I was to assess the environmental quality in the Great Bay Estuary, focusing on the lower Piscataqua River area in relation to PNS. Phase II, focused on the environment directly offshore of PNS, characterizing the ecological risk at each AOC offshore of PNS.

The primary studies conducted during Phase I and Phase II included: chemical and/or physical analysis of sediment and surface water, various biological community and population assessments and toxicity tests, and chemical analysis of biological samples.

The collective data and studies were then used to assess potential risks to the estuarine environment in the vicinity of PNS. A weight-of-evidence approach (comparing the strengths and weaknesses of the various measurement methods of exposure and effect) was used to characterize risk for each component of the ecosystem that may be impacted by site contaminants (i.e., assessment endpoints) at each AOC. Risk determinations for each assessment endpoint at each AOC were made using the results of the weight-of-evidence assessment. All AOCs had either low or intermediate ecological risk overall. No assessment endpoints showed high ecological risks. The ecological risks for each assessment endpoint were linked back to surface water and/or sediment exposure for chemicals that may have originated from onshore IRP sites [i.e., chemicals of potential concern (COPCs)]. The COPCs were identified as those chemicals more likely to exceed benchmark concentrations than ambient concentrations were likely to exceed benchmark concentrations, and could also be linked to an onshore IRP site.

The EERA concluded that risks to the assessment endpoints from chemicals in surface water were negligible to low; therefore, the Interim Offshore Monitoring Program only included the collection of sediment and biota samples. Based on the Interim Offshore Monitoring Program, the following chemicals were identified as the sediment COCs for OU4: copper, lead, nickel, acenaphthylene, anthracene, fluorene, and high molecular weight (HMW) PAHs.

Why is action needed at the site?

As a result of previous activities at OU4, copper, lead, nickel, and PAH concentrations in sediment at several monitoring stations are greater than levels that could result in risks to benthic invertebrates.

It is the current judgment of the Navy and EPA, in consultation with MEDEP, that the preferred alternatives, or one of the other active measures identified in this Proposed Plan, are necessary to protect public health and welfare from actual or threatened releases of these hazardous substances into the environment based on potential ecological risks.

Remedial Action Objectives

Remedial Action Objectives (RAOs) are the goals that a cleanup plan should achieve. They are established to protect human health and the environment, and comply with all pertinent federal and state regulations. The following RAO was developed for OU4 based on its current and reasonably anticipated future use:

- Eliminate unacceptable risk to ecological benthic receptors exposed to site-related COCs in suitable sediment habitats.

OU4 cleanup levels were developed in the FS for the sediment COCs (copper, lead, nickel, and PAHs) and are based on site-specific sediment and pore water toxicity tests. The proposed **cleanup levels** are listed in Table 1 and are based on average exposure.

TABLE 1 – OU4 Proposed Cleanup Levels

COC	Proposed Cleanup Level
Copper	486 parts per million (ppm)
Lead	436 ppm
Nickel	124 ppm
Acenaphthylene	210 parts per billion (ppb)
Anthracene	1,236 ppb
Fluorene	500 ppb
HMW PAHs	13,057 ppb

Summary of Remedial Alternatives

Remedial alternatives, or cleanup options, were identified in the OU4 FS to meet the RAO identified above. These alternatives are different combinations of plans to restrict access and to contain, remove, or treat contamination to protect the environment. As provided in the OU4 FS, no further action is required for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-13, and MS-14, because there are no current exceedances of the proposed cleanup levels that indicate an ecological risk. MS-11 does not have sufficient sediment to cause ecological risk; therefore, no further action is required for MS-11.

Alternatives for MS-01, MS-03, MS-04, and MS-12 were analyzed separately. Note that although the FS assumed that hydraulic dredging would be used to remove sediment, other forms of sediment removal, such as mechanical dredging, may be utilized for sediment removal alternatives, as determined by remedial action documents, if sediment excavation is part of the final remedies.

MS-01 Alternatives

- MS01-01 – No Action
- MS01-02 – Monitored Natural Recovery
- MS01-03 – Hydraulic Dredging with Off-yard Disposal

MS-03 and MS-04 Alternatives

- MS0304-01 – No Action
- MS0304-02 – Monitored Natural Recovery
- MS0304-03 – Hydraulic Dredging with Off-yard Disposal

MS-12A Alternatives

- MS12A-01 – No Action
- MS12A-02 – Containment, Land Use Controls (LUCs), and Monitoring
- MS12A-03–Partial Removal, Off-yard Disposal, Containment, and LUCs
- MS12A-04 – Complete Removal with Off-yard Disposal

MS-12B Alternatives

- MS12B-01 – No Action
- MS12B-02 – Monitored Natural Recovery
- MS12B-03 – Hydraulic Dredging with Off-yard Disposal

No Action Alternatives: MS01-01, MS0304-01, MS12A-01 and MS12B-01

"No action" alternatives, where no cleanup remedies would be applied at the site, were evaluated for each of the cleanup areas at OU4. This is required under CERCLA, and it serves as a baseline for comparison with other alternatives. The monitoring stations would be left as they are today under the no action alternatives.

MS-01 Alternatives

Monitored Natural Recovery

Alternative MS01-02 would consist of allowing naturally occurring processes to reduce ecological risks posed by the sediment COCs over time. Based on the location of MS-01, the naturally occurring contamination reduction processes are limited to biodegradation and dispersion. With the onshore removal of the ash as part of OU9 remediation, contaminants will no longer be deposited in the MS-01 offshore area as a result of erosion. Furthermore, because of the nature of the currents within the limits of MS-01, it is not expected that contaminated sediment from other locations would settle out in this area. Sediment samples would be collected and analyzed in accordance with a long-term monitoring plan to provide the data needed for determining when concentrations are reduced to acceptable levels. LUCs would be implemented at this location to prevent unauthorized disturbance of sediment until concentrations of COCs are less than cleanup levels. Five-Year Reviews would be required under this alternative to evaluate the continued adequacy of the remedy.

Hydraulic Dredging with Off-Yard Disposal

Alternative MS01-03 would consist of complete removal and off-yard disposal of contaminated sediment from the offshore area of MS-01. High flow rates within the Piscataqua River may have shifted some of the sediments since the samples were collected; therefore, prior to removal, sampling would be conducted to verify the extent of contaminated sediment. Alternative MS01-03 would remove the contaminated sediment; therefore, LUCs, operation and maintenance (O&M), monitoring, inspections, and Five-Year Reviews would not be required. All dredged sediment would be dewatered, stockpiled, and characterized within the material handling area, then transported to an approved off-yard treatment, storage and disposal (TSD) facility.

MS-03 and MS-04 Alternatives

Monitored Natural Recovery

Alternative MS0304-02 would consist of allowing naturally occurring processes to reduce ecological risks posed by the sediment COCs over time. Based on the locations of MS-03 and MS-04, the naturally occurring contamination reduction processes are limited to biodegradation and dispersion. Shoreline stabilization has been completed at the onshore areas associated with these monitoring stations; therefore, contaminants will no longer be deposited in the MS-03/MS-04 offshore areas as a result of erosion. Sediment samples would be collected and analyzed In accordance with a long-term monitoring plan to provide the data needed for determining when concentrations are reduced to acceptable levels. LUCs would be implemented to prevent unauthorized disturbance of sediment until concentrations of COCs are less than cleanup levels. Five-Year Reviews would be required under this alternative to evaluate the continued adequacy of the remedy.

Hydraulic Dredging with Off-Yard Disposal

Alternative MS0304-03 would consist of complete removal and off-yard disposal of contaminated sediment from the offshore areas of MS-03 and MS-04. Prior to removal, sampling would be conducted to verify the extent of contamination. Alternative MS0304-03 would remove the contaminated sediment; therefore, LUCs, O&M, monitoring, inspections, and Five-Year Reviews would not be required. All dredged sediment would be dewatered, stockpiled, and characterized within the material handling area, then transported to an approved off-yard TSD facility.

MS-12A Alternatives

Containment, LUCs and Monitoring

Alternative MS12A-02 would consist of constructing a containment barrier to prevent contaminated sediment within Building 178 from migrating into the Piscataqua River, thus removing the ongoing source of contamination to the offshore habitats. LUCs, O&M, and inspections would be implemented to ensure the containment barrier continues to function as designed. Sediment sampling locations would be established to evaluate the COC concentrations found in the sediment on the boat ramp outside Building 178. Over time, source removal and naturally occurring processes, such as sediment deposition, would reduce the COC concentrations found in the sediment. Five-Year Reviews would be required under this alternative to evaluate the continued adequacy of the remedy.

Partial Removal, Off-Yard Disposal, Containment, and LUCs

Alternative MS12A-03 would consist of removing contaminated sediment from the offshore portion of MS-12A outside Building 178, and also constructing a containment barrier. All dredged sediment would be dewatered, stockpiled, and characterized within the material handling area, then transported to an approved off-yard TSD facility. Contaminated sediment would remain inside Building 178 and would not be addressed until the fate of the building is decided; therefore, sediment removal would only be partial. The barrier would be constructed to prevent sediment remaining inside Building 178 from migrating to the Piscataqua River. Lastly, this alternative includes LUCs for areas where contamination remains in place (within Building 178). Five-Year Reviews would be required under this alternative to evaluate the continued adequacy of the remedy.

Complete Removal with Off-Yard Disposal

Alternative MS12A-04 would consist of complete removal with off-yard disposal of contaminated sediment from the offshore and onshore (within Building 178) portions of MS-12A. Alternative M12A-04 would remove all contaminated sediment; therefore, LUCs, O&M, monitoring, inspections, and Five-Year Reviews would not be required. All removed sediment would be dewatered, stockpiled, and characterized within the material handling area, then transported to an approved off-yard TSD facility.

MS-12B Alternatives

Monitored Natural Recovery

Alternative MS12B-02 would consist of allowing naturally occurring processes to reduce the ecological risks posed by the sediment COCs over time. Based on the location of MS-12B, the naturally occurring contamination reduction processes are limited to dispersion. Although sedimentation modeling has not been completed for MS-12B, it is expected that contaminant concentration would begin to decrease if sediment is removed from MS-12A. Sediment samples would be collected and analyzed in accordance with a long-term monitoring plan to provide the data needed for determining when concentrations are reduced to acceptable levels. LUCs would be implemented to prevent unauthorized disturbance of sediment until concentrations of COCs are less than cleanup levels. Five-Year Reviews would be required under this alternative to evaluate the continued adequacy of the remedy.

Hydraulic Dredging with Off-Yard Disposal

Alternative MS12B-03 would consist of complete removal and off-yard disposal of contaminated sediment from the offshore area of MS-12B. Prior to removal, sampling would be conducted to verify the extent of contamination. Alternative MS12B-03 would remove contaminated sediment; therefore, LUCs, O&M, monitoring, inspections, and Five-Year Reviews would not be required. All dredged sediment would be dewatered, stockpiled, and characterized within the material handling area, and then transported to an approved off yard TSD facility.

Evaluation of Alternatives

EPA has established nine criteria for use in comparing the advantages/disadvantages of the cleanup alternatives. These criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. These nine criteria are explained in the text box, What are the Nine Evaluation Criteria?, below. A detailed analysis of the alternatives can be found in the FS. The evaluated alternatives are compared based on seven of the nine criteria for MS-01, MS-03/MS-04, MS-12A, and MS-12B in Tables 2 through 5. The two modifying criteria, State Agency and Community Acceptance, are evaluated following the public comment period.

What are the Nine Evaluation Criteria?

The following is a summary of the nine criteria used to evaluate the remedial alternatives. The first two criteria are considered threshold criteria, and any alternative selected must meet them. The next five criteria are balancing criteria. The last two (the modifying criteria), state (MEDEP) and community acceptance, will be addressed after the public comment period on this Proposed Plan.

1. ***Overall Protection of Human Health and the Environment*** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. ***Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)*** evaluates whether an alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

3. ***Long-Term Effectiveness and Permanence*** considers the ability of an alternative to maintain protection of human health and the environment.

4. ***Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment*** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5. ***Short-Term Effectiveness*** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

6. ***Implementability*** considers the technical and administrative feasibility of implementing an alternative, including factors such as the relative availability of goods and services.

7. ***Cost*** includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. The alternative should provide the necessary protection for a reasonable cost. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. ***State/Support Agency Acceptance*** considers whether the state agrees with EPA's and Navy's analyses and recommendations, as described in the FS and Proposed Plan.

9. ***Community Acceptance*** considers whether the local community agrees with the Navy and EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Table 2 Comparison of MS-01 Remedial Alternatives			
Alternative	**MS01-01**	**MS01-02**	**MS01-03**
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	15
Achieving the Cleanup Objectives	NA	24-48	15
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	**o**	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	**o**	**o**
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	**o**
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (**Net Present Worth [NPW]** cost)	$0	$17,094 capital 30-year NPW: $311,538	$917,661capital 30-year NPW: $917,661
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	To be determined after the public comment period		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	To be determined after the public comment period		
Relative comparison of the Nine Balancing Criteria and each alternative: ● – Good, **o** – Average, ○ – Poor, NA – not applicable			

TABLE 3 COMPARISON OF MS-03 AND MS-04 REMEDIAL ALTERNATIVES			
ALTERNATIVE	**MS0304-01**	**MS0304-02**	**MS0304-03**
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	15
Achieving the Cleanup Objectives	NA	60-120	15
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	◉	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	◉	◉
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	◉
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (NPW cost)	$0	$17,904 capital 30-year NPW: $323,481	$745,410 capital 30-year NPW: $745,410
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	To be determined after the public comment period		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	To be determined after the public comment period		
Relative comparison of the Nine Balancing Criteria and each alternative: ● – Good, ◉ – Average, ○ – Poor, NA – not applicable			

Table 4 Comparison of MS-12A Remedial Alternatives				
Alternative	MS12A-01	MS12A-02	MS12A-03	MS12A-04
Estimated Time Frame (months)				
Designing and Constructing the Alternative	NA	13	15	15
Achieving the Cleanup Objectives	NA	60-120	15	15
Criteria Analysis				
Threshold Criteria				
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●	●
Primary Balancing Criteria				
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	⊙	⊙	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	⊙	●	●
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	⊙	⊙
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (NPW cost)	$0	$369,626 capital 30-year NPW: $675,807	$1,305,682 capital 30-year NPW: $1,601,353	$1,134,478 capital 30-year NPW: $1,134,478
Modifying Criteria				
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	To be determined after the public comment period			
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	To be determined after the public comment period			
Relative comparison of the Nine Balancing Criteria and each alternative: ● – Good, ⊙ – Average, ○ – Poor, NA – not applicable				

Table 5 Comparison of MS-12B Remedial Alternatives			
Alternative	MS12B-01	MS12B-02	MS12B-03
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	14
Achieving the Cleanup Objectives	NA	24-48	14
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	○	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	◉	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	◉	◉
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	◉
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (NPW cost)	$0	$17,094 capital 30-year NPW: $309,149	$428,824 capital 30-year NPW: $428,824
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	To be determined after the public comment period		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	To be determined after the public comment period		
Relative comparison of the Nine Balancing Criteria and each alternative: ● – Good, ◉ – Average, ○ – Poor, NA – not applicable			

PREFERRED ALTERNATIVES

Based on information available at this time, the Navy recommends Alternatives MS01-03, MS0304-03, MS12A-04, and MS12B-03 to address contaminated sediment at OU4 and to provide long-term risk reduction. The Navy believes that these preferred alternatives meet the threshold criteria and provide the best balance of tradeoffs among the other alternatives with respect to the modifying criteria (Tables 2 through 5). The Interim Offshore Monitoring Program determined that there were no unacceptable risks at these monitoring stations; therefore, no further action is the preferred alternative for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14. The Navy proposes that the preferred alternatives be the final remedies for OU4.

The Navy expects the preferred alternatives to satisfy the following statutory requirements of CERCLA Section 121(b): (1) be protective of human health and the environment; (2) comply with **ARARs**; (3) be cost-effective; and (4) utilize permanent solutions to the maximum extent practicable. The Navy may decide to change its preferred alternatives in response to public comment or new information. After the end of the public comment period on this Proposed Plan, the Navy, with the concurrence of EPA and after consultation with MEDEP, will document its selected remedy in a ROD.

The Navy proposes removal of contaminated sediment to reduce concentrations of COCs for MS-01 (PAHs), MS-03 (copper), MS-04 (copper and PAHs), MS-12A (lead and PAHs), and MS-12B (lead) to cleanup levels (see Table 1 on Page 9) to meet the RAO. The Navy proposes to remove contamination such that LUCs, O&M, monitoring, inspection, and Five-Year Reviews would not be required as part of implementation of these remedies. The proposed MS-01, MS-03 and MS-04, MS-12A, and MS-12B alternatives (Figures 4, 5, 6, and 7) would include excavation of sediment at each monitoring station to a depth defined for each area to meet the RAO and cleanup levels, dewatering of excavated sediment, and disposal in an off-yard landfill. For MS-12A, the alternative would include excavation of offshore sediment (outside of Building 178) and within the intertidal area of Building 178 (see Figure 6). The remedial action documents would specify the requirements for dredging, dewatering, and disposal. Sampling would be conducted to make sure that contaminated sediment is removed such that the RAO and cleanup levels are met, and the remedial action documents would specify the requirements for sampling.

Alternatives MS01-03, MS0304-03, and MS12B-03 are preferred over the other alternatives for these monitoring stations because they provide the Navy's preferred balance between long-term effectiveness for current and planned future industrial use of the site, implementability, and cost. Alternatives MS01-03, MS0304-03, and MS12B-03 would remove contaminated sediment at each respective monitoring station and prevent potential exposure to ecological receptors, rather than relying on natural attenuation to gradually decrease COC concentrations, as provided under Alternatives MS01-02, MS0304-02, and MS12B-02. The additional cost of Alternatives MS01-03, MS0304-03, and MS12B-03, as compared to the costs of MS01-02, MS0304-02, and MS12B-02, are warranted because of the significantly greater protection they provide in the long-term. It is anticipated that Alternatives MS01-03, MS0304-03, and MS12B-03 would achieve cleanup goals a year or more before the respective alternatives MS01-02, MS0304-02, and MS12B-02.

Alternative MS12A-04 is preferred over the other alternatives because it provides the Navy's preferred balance between long-term effectiveness for current and planned uses of the monitoring station, implementability, and cost. Alternative MS12A-04 would remove contaminated sediment from the monitoring station and prevent potential exposure to ecological receptors, rather than relying on natural attenuation to gradually decrease COC concentrations. The removal of sediment would also prevent any future migration of contaminated sediment from the intertidal area inside Building 178 to the offshore area without the need for placement and long-term O&M of a containment barrier. Alternative MS12A-02 would not include any direct removal of contamination, and would rely on natural processes to gradually decrease COC concentrations. It is anticipated that Alternatives MS12A-03 and MS12A-04 would achieve cleanup goals a year or more before Alternative MS12A-02. Alternative MS12A-04 requires a significantly greater cost than Alternative MS12A-02, and a slightly lesser cost than Alternative MS12A-03.

Overall, the Navy prefers excavation of contaminated sediment over the monitored natural recovery alternative because excavation will actively reduce concentrations in the offshore sediment to less than cleanup levels in a shorter time with greater confidence in achievement of the RAO. Onshore removal actions have been conducted to eliminate the sources of contamination to the offshore from IRP sites and reduction in concentrations of COCs at the various monitoring stations has been observed over the course of the interim offshore monitoring program. However, residual concentrations of COCs in sediment in portions of these four monitoring stations remain at levels that are a potential ecological risk. Excavation of contaminated sediment to meet cleanup levels at MS-01, MS-03, MS-04, and MS-12, and no further action for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14 would result in no further risks associated with Site 5 and the OU4 AOCs, thereby resulting in unlimited use and unrestricted exposure for OU4 and removal of OU4 from the IRP. With the implementation of the final remedies for OU4, interim offshore monitoring will be discontinued.

Figure 4 - Alternative MS01-03 - Dredging with Off-Yard Disposal

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\MONITORING SITE MAPS\MS-01_ALT_4_2012_NTB.MXD 1/30/2013 JEE

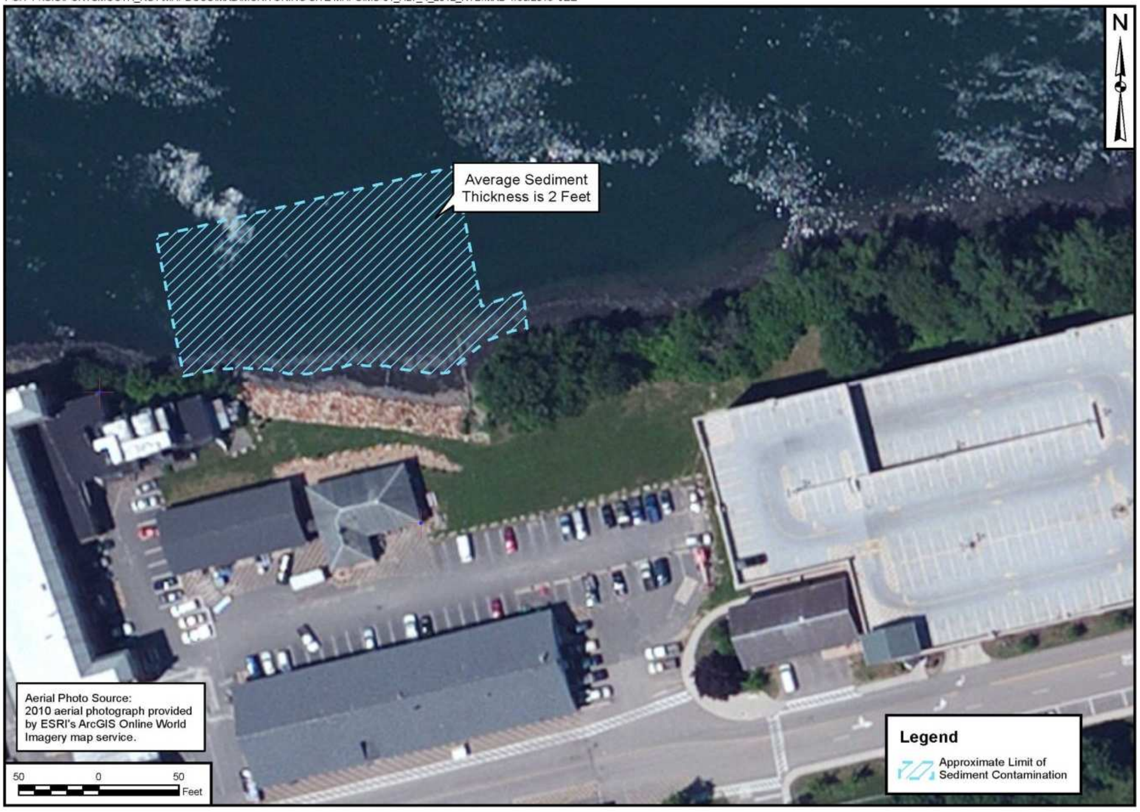


Figure 5 - Alternative MS0304-03 - Dredging with Off-Yard Disposal

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\SITE32_COPPER_ALTERNATIVE3_2012_NTB.MXD 01/30/13 JEE

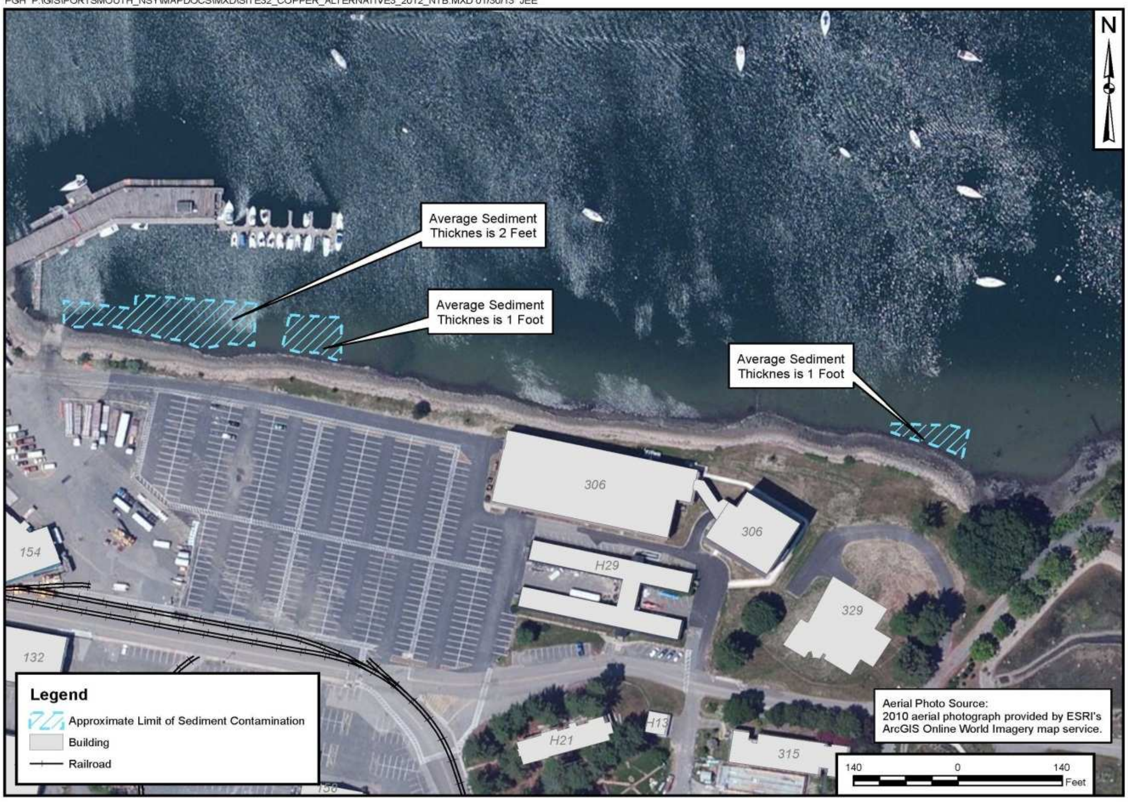


Figure 6 - Alternative MS12A-04 - Complete Removal and Off-Yard Disposal

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\MONITORING SITE MAPS\MS-12A_ALTERNATIVE4_2012_NTB_V2.MXD 01/30/13 JEE

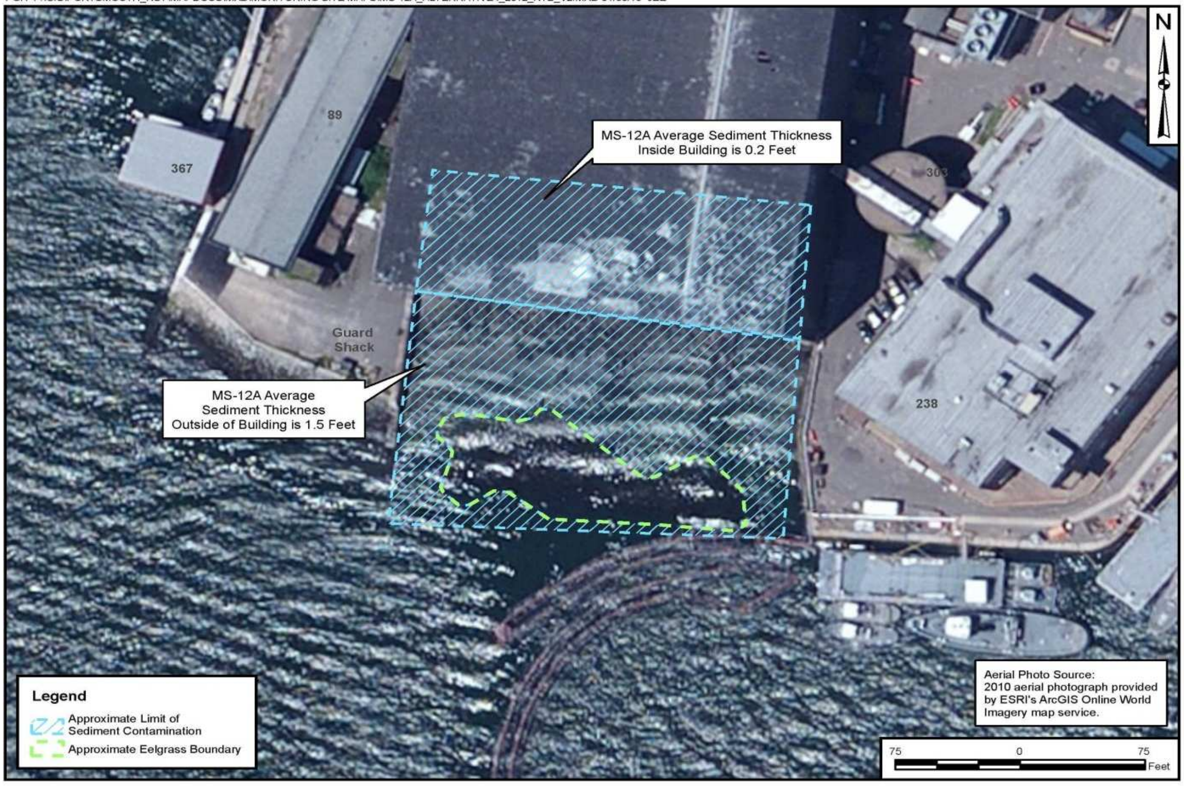
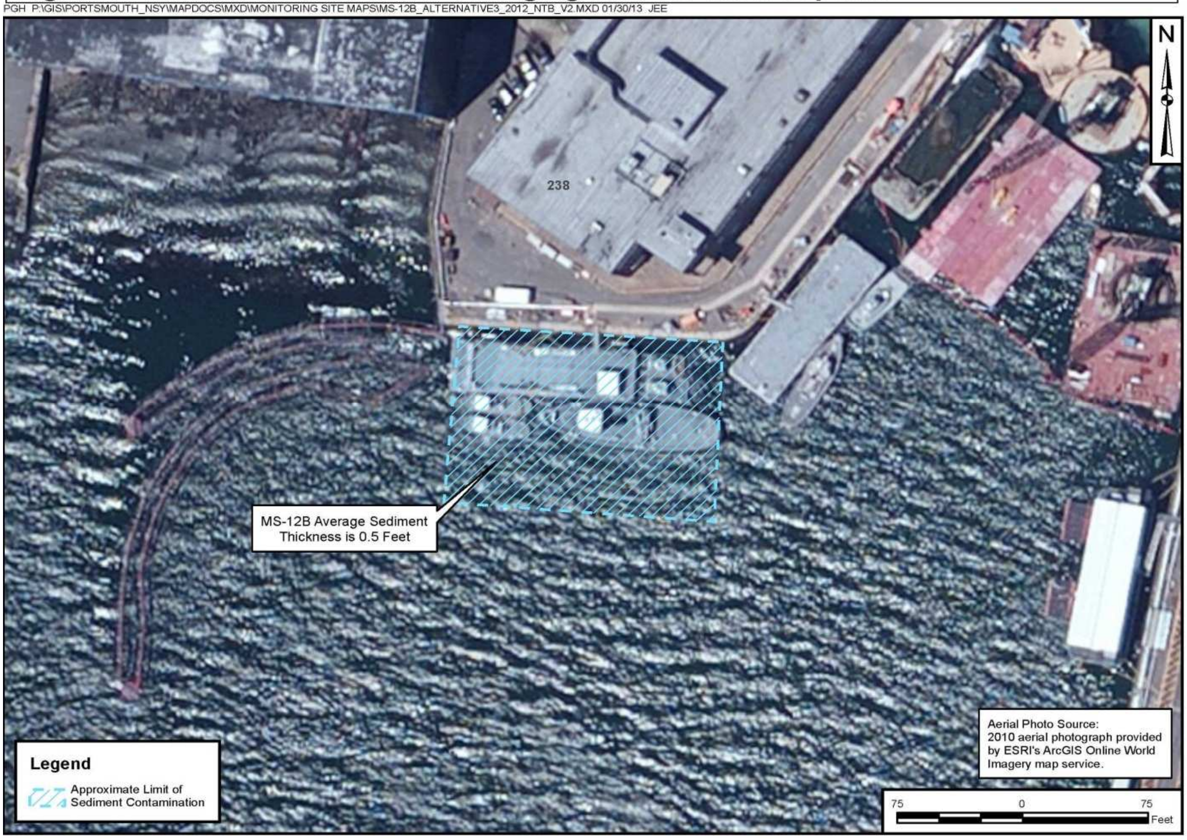


Figure 7 - Alternative MS12B-03 - Dredging with Off-Yard Disposal

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\MONITORING SITE MAPS\MS-12B_ALTERNATIVE3_2012_NTB_V2.MXD 01/30/13 JEE



Five-Year Review Requirements

Contamination would not remain at OU4 in excess of levels that allow for unlimited use and unrestricted exposure; therefore, reviews of the remedy protectiveness would not be needed every 5 years.

COMMUNITY PARTICIPATION

The public is encouraged to participate in the decision-making process for the cleanup of OU4 by reviewing and commenting on this Proposed Plan during the public comment period, which is February 27 to March 28, 2013.

What Do You Think?

You do not have to be a technical expert to comment. If you have a comment, the Navy would like to hear it before beginning the cleanup.

What is a Formal Comment?

Federal regulations make a distinction between "formal" comments received during the 30-day comment period and "informal" comments received outside this comment period. Although the Navy uses comments throughout the cleanup process to help make cleanup decisions, it is required to respond to formal comments.

Your formal comments will become part of the official record for OU4. This is a crucial element in the decision-making process for the site.

The Navy will consider all significant comments received during the comment period prior to making the final cleanup decision for the site. Written comments will be included in the Responsiveness Summary contained in the ROD.

Formal comments can be made in writing or made orally. To make a formal comment on the Proposed Plan, you may:

- Offer oral comments during the public hearing on March 13, 2013.
- Provide written comments at the informational open house, public hearing, or by fax or mail. Comments must be postmarked no later than March 28, 2013.

A tear-off mailer is provided as part of this document for your convenience.

NEXT STEPS

The Navy will consider and address all significant public comments received during the comment period. The responses to comments will be included in the Responsiveness Summary in the ROD, which will document the final CERCLA remedies selected by the Navy and EPA, in consultation with MEDEP, for OU4. After the ROD is signed, it will be made available to the public on the public website and at the Information Repositories.

To Comment Formally:

Send Written Comments postmarked no later than March 28, 2013 to:

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Portsmouth, NH 03804-5000

Fax Comments by March 28, 2013, to the attention of:

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Fax: (207) 438-1266

For More Detailed Information You May Go to the Public Information Repository or Public Website

The Proposed Plan was prepared to help the public understand and comment on the preferred cleanup alternatives for OU4 and provides a summary of a number of reports and studies.

Information Repositories

Rice Public Library
8 Wentworth Street
Kittery, Maine 03904
Telephone: (207) 439-1553

Portsmouth Public Library
175 Parrott Avenue
Portsmouth, New Hampshire 03801
Telephone: (603) 427-1540

Public Website
http://go.usa.gov/vvb

GLOSSARY OF TERMS

This glossary defines the bolded terms used in this Proposed Plan. The definitions in this glossary apply specifically to this Proposed Plan and may have other meanings when used in different circumstances.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal, state, and local environmental rules, regulations, and criteria that must be met by the selected cleanup action under CERCLA.

Assessment Endpoint: An assessment is a component of the ecosystem that may be impacted by the stressors of concern, has ecological and societal value, and represents a component of the ecosystem that can be protected.

Chemical of Concern (COC): Chemicals of potential concern that through further evaluation in human health and screening-level ecological risk assessment are determined to present a potential adverse effect on human and ecological health and the environment.

Cleanup Level: A numerical concentration agreed upon by the Navy and EPA, in consultation with MEDEP, as having to be reached for a certain COC to meet one or more of the RAOs. A cleanup level may be a regulatory-based criterion, a risk-based concentration, or even a background value.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law also known as "Superfund." This law was passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Estuarine Ecological Risk Assessment (EERA): An evaluation of current and future potential for adverse effects on ecological receptors in an estuary from exposure to site contaminants.

Feasibility Study (FS): A report that presents the description and analysis or evaluation of potential cleanup alternatives for a site. The report also provides other remedial options screened out in the Feasibility Study that were not considered to be applicable for the site conditions.

Human Health Risk Assessment: An evaluation of current and future potential for adverse human health effects from exposure to site contaminants.

Metals: Metals are naturally occurring elements. Some metals, such as arsenic and mercury, can have toxic effects. Other metals, such as iron, are essential to the metabolism of humans. Metals are classified as inorganic because they are a mineral, and not of biological origin.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): More commonly called the National Contingency Plan, it is the federal government's blueprint for responding to both oil spills and hazardous substance releases. Following the passage of Superfund (CERCLA) legislation in 1980, the NCP was broadened to cover releases at hazardous waste sites requiring emergency removal actions. A key provision involves authorizing the lead agency to initiate appropriate removal action in the event of a hazardous substance release.

Net Present Worth (NPW): A costing technique that expresses the total of initial capital expenditure and long-term operation and maintenance costs in terms of present day dollars.

Polycyclic aromatic hydrocarbons (PAHs): High molecular weight, relatively immobile, and moderately toxic solid organic chemicals that feature multiple benzenic (aromatic) rings in their chemical formula. PAHs are normally formed during the incomplete combustion of coal, oil, gas, garbage, or other organic substances. High molecular weight (HMW) PAHs are made up of four to seven aromatic rings. These PAHs are generally less toxic to aquatic organisms than low molecular weight (LMW) PAHs, but some are still known carcinogens.

Record of Decision (ROD): An official document that describes the selected cleanup action for a specific site. The ROD documents the cleanup selection process and is issued by the Navy following the public comment period.

Remedial Action Objective (RAO): A cleanup objective agreed upon by the Navy and EPA, in consultation with MEDEP. One or more RAOs are typically formulated for each environmental site.

Remedial Investigation (RI) or Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI): An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund or RCRA site, establish site cleanup criteria, identify preliminary alternatives for remedial action, and support technical and cost analyses of alternatives.

Use This Space to Write Your Comments

Your input on the Proposed Plan for contamination at OU4 at Portsmouth Naval Shipyard is important to the Navy, EPA, and MEDEP. Comments provided by the public are valuable in helping to select the remedy for this site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by March 28, 2013. Comments can be submitted via mail or fax and should be sent to the following address:

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Portsmouth, NH 03804-5000

Fax: (207) 438-1266

Name:	
Address:	
City:	
State:	Zip Code:
Telephone:	

FOLD HERE

PLACE
STAMP
HERE

Ms. Danna Eddy

Public Affairs Office (Code 100PAO)

Portsmouth Naval Shipyard

Portsmouth, NH 03804-5000

Ad Number: 148699
Insertion Number: N/A
Size: 2 Col x 7.5 in
Color Type: N/A

Advertiser: Tetra Tech
Agency: N/A
Section-Page-Zone(s): A-7-All
Description: OU 4

Portsmouth Herald
Wednesday, February 27, 2013

HEALTH INDUSTRY: N.H. DRUG TESTING BILL IS TOO VAGUE

BY MORGAN TRUE
Associated Press

CONCORD — Representatives from the health care industry said Tuesday they have a vested interest in stopping employees from stealing controlled substances, but a bill being considered by New Hampshire lawmakers to drug test their workers is too vague.

The proposal is part of the legislative response to a recent scandal at Exeter Hospital, where an employee allegedly stole drugs and replaced them with hepatitis C-infected syringes later used on patients.

Chief among industry concerns aired at a legislative hearing are the definition of a health care worker and who would pay for the drug tests — specifics not included in the one-page bill.

At the House Committee on Health Human Services and Elderly Affairs hearing, there was a tense exchange between Gary Cahoon, operator of an assisted-living facility in New Ipswich, and Rep. Patrick Culbert, R-Pelham, over how to define a health care worker.

"It surely isn't kitchen help," Culbert said, sounding agitated.

The bill would require all health care workers be randomly drug tested four times per year. Its sponsor, Rep. Tim Copeland, R-Stratham, was not present to answer questions.

In the 28 years he's worked at the assisted-living home, Cahoon said he's seen close to a half-dozen cases of employees stealing drugs, and he acknowledged such cases are increasing. But he estimated that if he had to pay for drug testing all 15 of his employees, it would cost him 1 percent of his total profits — a heavy burden during tight financial times.

Betsy Miller, with the New Hampshire Association of Counties, said a recent case at Merrimack County Nursing Home, where a contracted employee allegedly tried to steal liquid pain medication, drives home the need for such legislation, but, without specifics, she can't support the bill.

Miller added there is already a system for testing workers that gives employers probable cause, such as showing signs of intoxication on the job. Devon Chaffee, with the New Hampshire Civil Liberties Union, said drug testing without probable cause could violate workers' constitutional rights.

Steve Ahnen, president of the New Hampshire Hospital Association, said his group is not taking a position on the legislation, but thanked lawmakers for working to address the issue.

"(This bill) is a measure that was introduced in the wake of the tragic events that occurred last summer," he said, referring to the hepatitis C outbreak at Exeter Hospital. "I just want to comment about what an awful and horrific situation that was, and is, for those patients, their families and their caregivers."

David Kwiatkowski, a traveling medical worker whom prosecutors describe as a "serial infector," was hired in Exeter in April 2011 after working in 18 hospitals in Arizona, Georgia, Kansas, Maryland, Michigan, New York and Pennsylvania. Thirty-two Exeter Hospital patients have been found to have the same strain of the liver-destroying virus Kwiatkowski carries.

Rep. Tom Sherman, D-Rye, a physician at Exeter Hospital who serves on the hospital association's steering committee, said the bill was written prior to the hospital association developing recommendations to meet the filing deadline. He added it will likely be amended before the House committee votes on it.

3rd man to be sentenced in missing mom case

CONCORD (AP) — A New Hampshire man has reached a plea agreement with prosecutors in the 2011 disappearance and death of a Maine woman whose toddler daughter was found abandoned in her car.

Michael Petelis of Ossipee is scheduled for a plea-and-sentencing hearing at 1 p.m. today in Carroll County Superior Court.

Petelis was charged with conspiracy to commit robbery in the case of Krista Dittmeyer, of Portland, Maine. Her body was found in a snowmaking pond at Cranmore Mountain in Conway five days after her car was found idling in the ski area's parking lot — her 14-month-old daughter unharmed inside.

Prosecutors said Dittmeyer was lured to Petelis's apartment by her close friend, Anthony Papile, also of Ossipee. Senior Assistant Attorney Jane Young said at Papile's sentencing last May that Papile clubbed Dittmeyer in the head three times as she was climbing the stairs. Prosecutors said the pair had plotted to steal drugs and money from her.

Young said Papile and Petelis bound Dittmeyer's legs and torso with duct tape and put her in the trunk of her car, which Papile drove to the ski area. Papile, a former ski area employee who helped build the snowmaking pond, admitted he held her bound body underwater and then pushed her away from land. The cause of her death was prolonged cold-water submersion.

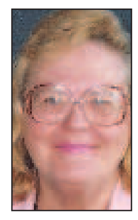
Papile was sentenced to 50 years in prison for Dittmeyer's death.

Another man, Trevor Ferguson of Tamworth, was sentenced to at least seven years in prison for conspiring to rob her. Prosecutors said Ferguson agreed to give Papile a ride home from the ski area in exchange for money and drugs.

At Papile's sentencing, Dittmeyer's mother tearfully recalled what a loving mother she was to her daughter, Aliyah.

"That day in April, Anthony Papile took away my daughter, a sister, a mother and a kind and loving friend," said Lanell Shackley, who is caring for Aliyah.

Virginia M. Warner



CAPE NEDDICK, Maine — Virginia "Ginny" Marilyn Warner, 79, passed away Sunday, Feb. 24, 2013, at Portsmouth Regional Hospital, after a brief illness.

Ginny was born March 12, 1933, in Fitchburg, Mass., the daughter of the late Alice G. (Webber) Lawrence and Robert F. Lawrence. From early childhood, she grew up on Logging Road in Cape Neddick. She graduated from York High School in 1950 and earned an associate's degree in liberal arts from Colby Sawyer College in 1952. Upon graduation, she worked as a dental assistant for Dr. Filson in Ogunquit, Maine.

On Feb. 27, 1954, she married the love of her life, Henry F. Warner Jr. They resided on Logging Road for most of their lives. While raising a family, Ginny was active both in the community and in her church; she worked as a teacher's aide and also volunteered for many years at York Hospital.

As a lifelong member of Cape Neddick Baptist Church, Ginny served as Christian education chairperson, Sunday School superintendent, missions advocate, Sunday School teacher, and Vacation Bible School director and teacher. She belonged to American Baptist Women, Children's Message and The Prayer Chain, and enjoyed singing in the choir. On three occasions, she served on the Pastoral Search Committee. For several years, Ginny organized the America for Christ Walkathon.

Ginny was a devoted wife, mother and grandmother. She enjoyed being with her family and friends. She and Henry loved spending time at their camp on Brassua Lake. Her favorite pastime was searching for moose, deer, loons and other wildlife.

Throughout the years, Ginny was involved in the activities of her children and grandchildren; she attended many of their sporting and school-related events.

The family would like to thank the staff of Durgin Pines for providing excellent care.

She is survived by her husband, Henry F. Warner Jr.; son Henry F. "Mickey" Warner III and his wife, Ginny, and her children, William Woodward, Jonathan Woodward and his wife, Sarah, and their children, Lauren and Ryan; son Robert F. Warner and his wife, Andrea, and their sons, Eric and Wesley; son Ronald C. Warner and his wife, Kirsten, and their two children, Lindsay and Jonathan; and several cousins.

SERVICES: Calling hours for Ginny will be held from 5 to 8 p.m. Thursday, Feb. 28, in the Lucas & Eaton Funeral Home, 91 Long Sands Road, York. A funeral service will be held at 1 p.m. Saturday, March 2, in the Cape Neddick Baptist Church, 34 River Road, Cape Neddick. In lieu of flowers, consider donating to Cape Neddick Baptist Church or York Hospital. Visit www.lucaseatonfuneralhome.com.

Robert C. Edgerly

NEWMARKET — Robert C. Edgerly, 73, of Newmarket, died Monday, Feb. 25, 2013, at Exeter Hospital, after a long illness.

Born Oct. 5, 1939, in Newmarket, he was the son of Charles and Lucille (Smith) Edgerly and was a lifelong resident of Newmarket.

He was employed with Bell & Flynn for 30-plus years prior to his retirement.

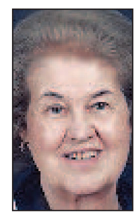
Bob loved spending time with his family and friends at camp, hanging out in the garage, hunting and fishing.

He was a 30-year member of the Sons of The American Legion, Squadron 67, and was a member of Lamprey Aerie No. 1934 Fraternal Order of Eagles, both in Newmarket, and the Dover Lodge of Elks No. 184.

He is survived by his wife of 50 years, Loretta (Young) Edgerly of Newmarket; three children, Richard C. Edgerly and his wife, Penny, of Newmarket, Robin Olson and her husband, Robert Jr., of Newington, and Rhonda Reilly and her husband, Wayne, of Newmarket; five grandchildren, Richard R. Edgerly, Jayson A. Edgerly, Robert Olson III, Jessica Clay and Sarah Reilly; six great-grandchildren; a brother, Fred Edgerly of Newmarket; and several nieces, nephews and cousins.

SERVICES: There will be a celebration of Bob's life from 1 to 4 p.m. Saturday, March 9, at the Robert G. Durgin American Legion Hall, Main Street, Newmarket. Family and friends are invited. Rather than flowers, should friends desire, memorials may be made to Newmarket Fire & Rescue, 4 Young Lane, Newmarket, NH 03857. Visit www.kentandpelczarfh.com to sign an online guest book.

Helen D. Place



TEWKSBURY, Mass. — Helen D. (Johnson) Place, 94, of Tewksbury and York, Maine, passed away Monday, Feb. 25, 2013.

Helen was born April 17, 1918, in East Greenwich, R.I., daughter of the late Maude (Sayles) and Menus Johnson. She grew up in Providence, graduating from Hope High School before she began to work for Cherry & Webb.

After she married Elmer M. Place, she stayed at home for several years to be with her children and then worked at Commercial Bank & Trust for nearly 20 years. She and her husband Elmer also loved the beaches and waterfront on Cape Cod, where they had a home on Marstons Mills and often visited the harbor in Osterville.

Those who knew Helen will remember a woman whose life revolved around faith and family. She was a devoted member of the Fourth Baptist Church in Providence.

Elmer, her husband of 50 years, passed away in 1992. Her two sisters and one brother also predeceased her.

She is survived by her daughters, Marcia Warren and her husband, Christopher, Linda Lucas and her husband, Charles and Joan Keeler; her son David Place, and Barbara; her grandchildren, Melissa Flores, Todd Peterson, Tiffany Lebron, Christopher and Ashley Lucas, Jeffrey and John Keeler, Heidi Stuck, and Kristen, Matthew and Joshua Place; 17 great-grandchildren; and several nieces and nephews.

SERVICES: All are invited to a calling hour for Helen from 10 to 11 a.m. Thursday Feb. 28, at Roney Funeral Home, 152 Worcester St., North Grafton, followed by the celebration of her funeral service at 11:30 a.m. at Liberty Church, 495 Hartford Turnpike, Shrewsbury. She will then be laid to rest with her husband at Acotes Hill Cemetery in Chepachet, R.I. In lieu of flowers, her family requests honoring with memorial donations to Liberty Church, 495 Hartford Turnpike, Shrewsbury MA 01545. Directions and an online condolence book to share memories of Helen are available at www.roneyfuneralhome.com.

Richard E. LeClair

NORTH HAMPTON — Richard E. LeClair, 86, of North Hampton, died Monday, Feb. 25, 2013, at Exeter Hospital.

He was born April 14, 1926, in Claremont, a son of the late Alexander and Rosanna (Dansereau) LeClair. Raised in Claremont, he was a 1944 graduate of Stevens High School.

A veteran of World War II, Mr. LeClair enlisted as an aviation cadet and served as a tail gunner in B-17s and as a flight engineer in B-25s with the U.S. Army Air Forces. He was a sergeant when honorably discharged in 1946.

In 1951, he graduated from Keene State College, and he received his master's degree in education from Boston University in 1960. His career in education began in 1951 at Colebrook Academy, Colebrook. He later worked many years as a counselor at Northern Essex Community College in Haverhill, Mass., where he retired in 1988.

Mr. LeClair resided in North Hampton since 1969, coming from Kingston. He was a member of the Guidance Association and the Keene Teachers Alumni Association.

He shared 59 years of marriage with his wife, Mary P. (Morency) LeClair.

In addition to his wife, family members include three sons, Keith A. LeClair and Brett M. LeClair, both of North Hampton, and Brian Le Clair of Pasadena, Calif.; a brother, Alec LeClair of Newbury; two sisters, Eleanor Jones of Claremont and Carolyn Sheehan of Tampa, Fla.; and many nieces and nephews.

SERVICES: A Mass of Christian burial will be celebrated at 10 a.m.. Friday, March 1, at St. Theresa Church, 815 Central Road, Rye Beach. Interment will be private in the Center Cemetery, North Hampton, in the spring. In lieu of flowers, donations may be made to the St. Theresa Church for their Christmas Program, or to Maryknoll Lay Missioners, P.O. Box 307, Maryknoll, NY 10545-0307. Arrangements are by the Remick & Gendron Funeral Home-Crematory, Hampton. For directions or to sign an online guest book, visit www.RemickGendron.com.

Legal Notice
New Hampshire Department of Education
Request for Proposals (RFP)
Educational Surrogate Parent Program:
Regional Master Surrogate Parents
RFP #SPED-2013-1

The NH Department of Education. Bureau of Special Education is currently seeking proposals for up to five (5) Regional Master Educational Surrogate Parents who will be responsible fDI providing management, phone and e-mail support for educational surrogate parents in assigned regions. The five (5) regions are: (1) North Country; (2) Lakes Region; (3) Southwest: (4) South Central: and, (5) Southeast.

A request for a copy of the RFP may be made to Barbara Raymond at 603-271-3791 or Barbara.Raymond@doe.nh.gov: on the web at: http://www.education.nh.gov /rfp/index.htm.
The deadline for submittal of proposals is 4:00pm, Friday, March 15, 2013.

#7844 3t P 2/25,26,27

Legal Notice
NOTICE OF FORECLOSURE SALE AT PUBLIC AUCTION
SELF-STORAGE OPERATORS FACILITY LIEN SALE
TO BE SOLD ON THE PREMISES CONTENTS OF STORAGE UNITS TO COVER STORAGE CHARGES

A. Storage King LLC will sell at public auction at 10:00 am on Friday, March 8, 2013. A. Storage King LLC, Exeter, New Hampshire, contents of the following mini-storage units believed to contain household furnishings and business items: Unit #0406 Shanti Curley; Units #0233, #0309 Cheryl Gilman-White; Unit #0409 Bruce Warner; Unit #0114 Jennifer Weitz; Unit #0105 David Weston.
Storage units contain furniture, household items and more. The doors and containers will be open and visible inspection can be made at the time of bidding. There are no warranties expressed or implied. Terms: Cash, Certified Check – 10% Buyers premium. A. Storage King LLC reserves the right to withdraw items at the time of auction due to owners' redemption. All items will be sold to the highest bidder. Paul J. Maglio Auctioneer Storage Auction Solutions NH LIC#4001. A. Storage King LLC 6 Kingsway Ave. Exeter, NH 03833 603-772-4500.

#2739 2tPHE 2/27, 3/1

Legal Notice
PUBLIC NOTICE

The Department of the Navy announces the availability for public comment of the Proposed Plan for cleanup of contamination at Operable Unit (OU) 4 at Portsmouth Naval Shipyard (PNS). This plan was prepared under the Comprehensive Environmental Response, Compensation and Liability Act (also known as Superfund). The public comment period for this Proposed Plan begins February 27, 2013 and ends March 28, 2013.

OU4 includes Site 5 – the Former Industrial Waste Outfalls, and six areas of concern (AOCs). The former outfalls were along the Piscataqua River at the western end of PNS (in one of the AOCs), and past contamination from Site 5 is addressed as part this AOC. The AOCs are nearshore habitats adjacent to PNS that may have been affected by onshore Installation Restoration Program (IRP) sites. An interim action that required monitoring for OU4 was selected and implemented in 1999. As part of the interim monitoring, fourteen monitoring stations (labeled MS-01 through MS-14) were identified to provide coverage of the offshore AOCs. The interim monitoring program showed that chemicals of concern (COCs) for the offshore sediment are select polycyclic aromatic hydrocarbons and metals. Concentrations at COCs in sediment at some of the monitoring stations were greater than acceptable levels for ecological exposure (to organisms living in the sediment referred to as benthic invertebrates). The Navy has taken actions to eliminate the onshore IRP sources of contamination; however, additional action is required to address potential risks remaining in sediment at some of the monitoring stations at OU4. The OU4 cleanup alternatives were evaluated according to these monitoring stations.

Based on the OU4 investigation results, it was determined that risks are acceptable and therefore No Further Action is necessary for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14. COC concentrations in sediment at MS-01, MS-03, MS-04, and MS-12 were greater than acceptable levels and potential cleanup alternatives of monitored natural recovery, sediment removal, and/or containment were evaluated. MS-03 and MS-04 were combined due to close proximity and similarity in contamination, and MS-12 was evaluated as two areas, MS-12A and MS-12B, because of different levels of contamination and different planned site uses for the area. The Navy evaluated the effectiveness, implementability, and cost of these alternatives, and based on the results of the evaluation, the Navy's preferred method of addressing sediment contamination at MS-01, MS-03, MS-04, MS-12A, and MS-12B is to remove contaminated sediment and dispose of the sediment off yard.

Community input is integral to the remedy selection process. The public is encouraged to review the Proposed Plan for OU4 on the Navy's public website for PNS or at the Information Repositories at Rice and Portsmouth Public Libraries during normal hours of operation:

Rice Public Library	Portsmouth Public Library	Public Website
8 Wentworth Street	175 Parrott Avenue	http://go.usa.gov/vvb
Kittery, ME 03904	Portsmouth, NH 03801	(see the Administrative
207-439-1633	603-427-1540	Record tab)

On March 13, 2013, the Navy will hold a public meeting at the Kittery Town Hall in Kittery, Maine, consisting of an informational session to be held from 7:45 to 8:15 pm where Navy personnel will be on hand to provide information and answer questions regarding the OU4 proposed cleanup. Following this informational session, the Navy will accept oral and written comments from the public from 8:15 to 8:45 pm. Written comments can also be submitted during the public comment period by mail or fax to the Navy contact listed below, and must be postmarked no later than March 28, 2013.

Ms. Danna Eddy, Public Affairs Office (Code PA0100)
Portsmouth Naval Shipyard, Portsmouth, NH 03804-5000
Telephone: 207-438-1140 Fax: 207-438-1266

#21344 1t P 2/27

Foster's Daily Democrat

Classified Marketplace

February 27, 2013 Section | B

Announcements

17 Public Notice

Public Notice
Stor-All Mini Storage
113 Milton Rd, Rochester, NH 03868

Due to various unsuccessful and/or ignored attempts at notification of default in storage payment, legal notice of disposal is hereby given to the following individuals; units to be disposed of **March 6, 2013**

Name	Unit #
Arthur Morin	C-5
John McIsaac	C-17
June Molbeck	E-73
Michele & Dave Berry	H-29
Jean Bell	I-4
Michael Scherer	M-20

Announcements

17 Public Notice

PUBLIC NOTICE

The Department of the Navy announces the availability for public comment of the Proposed Plan for cleanup of contamination at Operable Unit (OU) 4 at Portsmouth Naval Shipyard (PNS). This plan was prepared under the Comprehensive Environmental Response, Compensation and Liability Act (also known as Superfund). The public comment period for this Proposed Plan begins February 27, 2013 and ends March 28, 2013.

OU4 includes Site 5 - the Former Industrial Waste Outfalls, and six areas of concern (AOCs). The former outfalls were along the Piscataqua River at the western end of PNS (in one of the AOCs), and past contamination from Site 5 is addressed as part this AOC. The AOCs are nearshore habitats adjacent to PNS that may have been affected by onshore Installation Restoration Program (IRP) sites. An interim action that required monitoring for OU4 was selected and implemented in 1999. As part of the interim monitoring, fourteen monitoring stations (labeled MS-01 through MS-14) were identified to provide coverage of the offshore AOCs. The interim monitoring program showed that chemicals of concern (COCs) for the offshore sediment are select polycyclic aromatic hydrocarbons and metals. Concentrations at COCs in sediment at some of the monitoring stations were greater than acceptable levels for ecological exposure (to organisms living in the sediment referred to as benthic invertebrates). The Navy has taken actions to eliminate the onshore IRP sources of contamination; however, additional action is required to address potential risks remaining in sediment at some of the monitoring stations at OU4. The OU4 cleanup alternatives were evaluated according to these monitoring stations.

Based on the OU4 investigation results, it was determined that risks are acceptable and therefore No Further Action is necessary for MS-02, MS-05, MS-06, MS-07, MS-08, MS-09, MS-10, MS-11, MS-13, and MS-14. COC concentrations in sediment at MS-01, MS-03, MS-04, and MS-12 were greater than acceptable levels and potential cleanup alternatives of monitored natural recovery, sediment removal, and/or containment were evaluated. MS-03 and MS-04 were combined due to close proximity and similarity in contamination, and MS-12 was evaluated as two areas, MS-12A and MS-12B, because of different levels of contamination and different planned site uses for the area. The Navy evaluated the effectiveness, implementability, and cost of these alternatives, and based on the results of the evaluation, the Navy's preferred method of addressing sediment contamination at MS-01, MS-03, MS-04, MS-12A, and MS-12B is to remove contaminated sediment off site and dispose of the sediment off yard.

Community input is integral to the remedy selection process. The public is encouraged to review the Proposed Plan for OU4 on the Navy's public website for PNS or at the Information Repositories at Rice and Portsmouth Public Libraries during normal hours of operation:

Rice Public Library
8 Wentworth Street
Kittery, ME 03904
207-439-1633

Portsmouth Public Library
175 Parrott Avenue
Portsmouth, NH 03801
603-427-1540

Public Website
http://go.usa.gov/vvb
(see the Administrative Record tab)

On March 13, 2013, the Navy will hold a public meeting at the Kittery Town Hall in Kittery, Maine, consisting of an informational session to be held from 7:45 to 8:15 pm where Navy personnel will be on hand to provide information and answer questions regarding the OU4 proposed cleanup. Following this informational session, the Navy will accept oral and written comments from the public from 8:15 to 8:45 pm. Written comments can also be submitted during the public comment period by mail or fax to the Navy contact listed below, and must be postmarked no later than March 28, 2013.

Ms. Danna Eddy
Public Affairs Office (Code PAO100)
Portsmouth Naval Shipyard
Portsmouth, NH 03804-5000
Telephone: 207-438-1140 • Fax: 207-438-1266

Announcements

17 Public Notice

CORRECTION
LEGAL NOTICE
Town of Newington, New Hampshire
Supervisors of the Checklist
PUBLIC NOTICE

The Newington Supervisors of the Checklist will hold a Public Session on Saturday, March 2, 2013 from 11:00-11:30 a.m. at Town Hall for new voter registrations.

Jane K. Kendall, Paula Caceda & Susan Philbrick
Supervisors of the Checklist

CITY OF ROCHESTER
NOTICE OF PUBLIC HEARING

Notice is hereby given that the Codes and Ordinances Committee of the Rochester City Council will conduct a Public Hearing on Thursday, March 7, 2013 at 7:00 p.m. in the City Council Chambers, City Hall, 31 Wakefield Street, Rochester, NH, relative to the following matter:

AMENDMENT TO ORDINANCES
CREATING CHAPTER 18 OF THE GENERAL ORDINANCES OF THE CITY OF ROCHESTER ENTITLED REGULATION OF CROSS-CONNECTIONS TO PREVENT BACKFLOW BETWEEN POTABLE AND NON-POTABLE WATER SYSTEMS

This amendment, if adopted, would create a new Chapter of the General Ordinances of the City of Rochester, to be known as Chapter 18 of the General Ordinances of the City of Rochester to be entitled "Regulation of Cross-Connections to Prevent Back-Flow Between Potable and Non-Potable Water Systems", and would adopt, in its stead, a new comprehensive zoning ordinance applicable throughout the City of Rochester". The new Chapter 18, would, among other things:

(a) outline the legal and practical purposes related to the enactment of the new Chapter 18;
(b) establish a system of administration with respect to the cross-connection program created by the new Chapter 18;
(c) establish a set of definitions for terms used in the new Chapter 18 for use in connection with the administration, interpretation, and enforcement of such new Chapter 18;
(d) create a permit system for backflow prevention devices and users;
(e) establish new standards, requirements, regulations and/or procedures relative to such matters administration, compliance monitoring, hazard level assessments and other matters related to the cross-connection - backflow prevention program created by the new Chapter 18
(f) make numerous significant additional changes to the that will be applicable to properties in the City of Rochester with regard to their the connections between their potable and non-potable water systems.

Copies of the proposed ordinance amendment entitled "Amendment to Ordinances Creating Chapter 18 of the General Ordinances of the City of Rochester Entitled Regulation of Cross-Connections to Prevent Backflow Between Potable and Non-Potable Water Systems", including the provisions of the proposed new Chapter 18 of the General Ordinances of the City of Rochester are available in the City Clerk's Office.

The PUBLIC HEARING on the above matter will be conducted by the Codes and Ordinances Committee of the Rochester City Council in the City Hall, City Council Chambers, 31 Wakefield Street, Rochester, New Hampshire.

Citizens are invited to attend the PUBLIC HEARING and to ask questions or otherwise speak on the proposal.

Persons with disabilities requesting accommodations should contact the City Clerk's Office, (tel. 332-2130) on or before, March 6, 2013, in order to make arrangements.

Kelly Walters,
Rochester City Clerk

Employment

146 Help Wanted

News Reporter

Foster's Daily Democrat, an award winning, hard-working, small daily newspaper based in Dover, N.H., is taking applications for a full-time reporter. College degree in journalism or commensurate professional experience preferred. Entry-level candidates encouraged, particularly those with experience in social media and web reporting. Send resume and cover letter to Rodney G. Doherty, Executive Editor, Foster's Daily Democrat, 150 Venture Drive, Dover, NH 03820. e-mail: rdoherty@fosters.com.

Geo. J. Foster & Co., Inc.
1873

George J. Foster & Co., Inc. is looking to fill the following positions:

Production

Inserting Machine Operators

No Experience Necessary

Hours Will Vary:
Sunday, Monday, & Tuesday
Day & Evening
Shifts

Average 20 Hours
Per Week

Applications Now Being Accepted

PLEASE APPLY AT
150 VENTURE DRIVE
Enterprise Park off
Sixth Street, Dover

Employment

146 Help Wanted

Household Steward
Year round, full time opportunity in NH seacoast area for a professional who has worked in a recent cleaning capacity for a family. Responsibilities include house cleaning, supply stocking, laundry, occasional food preparation of light meals, and running errands. Must be computer savvy with Mac experience. This position may involve occasional international travel as well as a rare weekend. 30k, outstanding benefits package, 10 paid holidays and more. Please submit resume and work references in Word format to
jobs@allstaffcorp.com

LITTLEFIELD CONCRETE FLOORS seeking concrete floor finisher. Experience required. Pay commensurate with experience, driver's license required. (207)646-5500

SERVICE STATION attendant needed part time . Monday thru Friday. Great job for someone reliable with an interest in automobiles. Apply in person: Bob's Gulf, 211 Central Ave., Dover

152 Medical-Dental-Nursing

Exciting opportunity available for a
Lifestyle Educator
in our busy Ob-Gyn practice. Enthusiasm for healthy living & desire to change lives, along with excellent patient education and independent work skills are required for this position. Nursing degree required. If this describes you, please forward your resume to:
Dover Women's Health, P.A.
700 Central Ave.
Dover NH 03820
Fax: (603) 740-4650 or email:
bvoce@doverwomenshealth.com

LNA Training
Dover
Days, Evening and weekends
Med Pro
Educational Services LLC
603.660.9040
www.MedProEducational.net

Instruction

210 Job Training

CNA/LNA Training Day, evening & weekend classes all held in Dover! Graduate in just 5-8 weeks! (603) 647-2174. www.LNAHealthCareers.com

Farm-Livestock

238 Dogs-Cats/Birds/Pets

AKC PUG PUPPIES, 4 males, with vet certificate $800 each. Call 603-332-2824

Merchandise

310 Articles for Sale

12 MJ HUMMEL Collector Plates "Little Companions" New $150. chal826@hotmail.com

1/2 Ton Utility Trailer, pickup frame, 4x8x4 plywood chasis, 18' wheels $95 343-8285

16.5' CANOE. GREAT Canadian fiber padded, back rests, paddles $200. 343-8285

2008 Maytag washer & dryer. white in color Excellent condition $550/ offer. 603-343-6918

2 LIFT CHAIRS, like new condition, Asking $350 each. or best reasonable offer, 603-351-8334

310 Articles for Sale

4 DRAWER Fireproof Filing Cabinet. $400.00. Call 603-755-3787

AIR CONDITIONERS (4) LG 6000BTU, Energy Star. Low profile, used 6x $150 343-8285

ARMOIRE 45"WX62"H SCANDINAVIAN 1800s antique light pine $880 343-8285

BACKHOE/LOADER BUCKET 7' WIDE good shape $250.00 Call 603-905-9595

BED QUEEN, 11" thick Pillowtop mattress & box. New. Cost $799 sell $299. 603-427-2001

BELL 2 BIKE carrier 1 1/4 hitch $20.00. Call 603-905-9595

Better 'N Bens Wood Stove with blower, stack, brick liner $300 343-8285

BLOOD PRESSURE MONITOR Homedics model BPA-450, like new $20. 603-659-6621

BOAT ANTENNA: 34" SHAKESPEARE model 5215, whip intact. $10. 603-659-6621

BOOK CASES (2) 6'Hx3'W. Solid wood, 1 with glass paine doors $165. 343-8285

BOOK CASE, SOLID wood, walnut stain, solid beadboard back 4'Hx 3'W. $85 343-8285

BRAND NEW Englander wood stove $500.00 in excellent condition. 25X36 Pet Carrier, used once, $50. 743-3230

BRAND NEW still in box tailgate for F-150 Ford 84'-86'. (603)755-3787

China Hutch Buffet 71"Wx79"Hx24"D. Heavy Pine, beadboard, Glass $985 343-8285

"COZY" 40,000 BTU Direct vent propane wall furnace, never used. $700. (603)755-3787

CRAFTSMAN 1 1/2 HP Wood Workers Router $30. 343-8285

CUB CADET Snowblower 26" pull & electric start, 2 hours of use. $749. 343-8285

DAYTON 12V 8500LB winch $425.00 or best offer. 603-905-9595

DOVER Moving Sale, furniture, tools, sports equipment 603-866-0878

East Lake love seat, matching chair, beige, casters, all excellent, $600. 652-4549

EXERCISE EQ...... ABLOUNGER IN excellent condition. $50 or best offer. 6036795966

FLOWER PRESS: MICROFLEUR 9"X9" like new, manual. $20. Call 603-659-6621

GAS STOVE, classic series, new heating element, $325 Call 603-335-3858

KITCHEN CABINETS Glazed cherry wood. New. Cost $8000. sell $1899. 603-427-2001

LP Gas Soapstone Stove by Woodstock Co. 28"Hx30"Wx24"D $985 343-8285

MCAFEE TOTAL PROTECTION 2013 for 3 PCs,new in box, protection. $25 603-659-6621

New Portable Gas Generator 3,500 watts with wireless remote starter. $425. 841-6406

OAK DINING set 48"x66" elliptical, 18" leaf, 4 Windsor back chairs, $345. 343-8285

146 Help Wanted

146 Help Wanted

NORTH COUNTRY INDEPENDENT LIVING, INC.
"CHANGING LIVES, BUILDING FUTURES"

A community based provider of residential services and supports for individuals to lead a high quality lifestyle accessing the community and developing life skills. NCIL excels at specialized services and providing quality of life.

Residential Advisors

If you are creative, enjoy being involved in the community, participating in many activities and have an interest in rehabilitation, we would appreciate speaking with you.

Minimum requirements include a High School Diploma or equivalent, valid driver's license. Experience and creativity with special needs a plus. Must be able to pass a NH Criminal Background Check. If interested please contact or send resume to:

Stacey Cushing
9 Strafford Road, Barrington, NH 03825
603-335-8696, 603-335-8314 (f) • scushing@ncilnh.com
NCIL is an Equal Opportunity Employer

ncil NORTH COUNTRY INDEPENDENT LIVING

310 Articles for Sale

PHONE: VTECH 5.8GHZ CORDLESS digital answering machine, AC adaptor. $7. 659-6621

PIRELLI P4 TIRES. P185/65 R15 88T About 10,000 miles. Set of 4. $100. 603-433-6525

Sears 9 horsepower snow blower, electric start, deluxe cab cover, $600 603-335-3933

SEARS 9H.P. 28" 6 speed electric start snowblower $600. Call 603- 755-3787

SNOWMOBILE TRAILER.... $100 OR best offer. Call 6036795966

String Trimmer by RedMax BCZ2660TS Speed-Feed. Used 1 hour. $275. 343-8285

TAN MICROFIBER RECLINING couch $100.00. 603-755-9938 melnjay@metrocast.net

TOPEAK SUSPENSION CHILD Carrier Bike Seat $100 Nice condition. chal826@hotmail.com

TROY-BILT POWER Washer, 6.75 HP Briggs Stratton like new. $200. 343-8285

USED propane kitchen stoves & hotwater heaters. Call 603- 755-3787

YAMAHA professional keyboard psr 2100 home use only like new $600. 603-742-3495

370 Firewood

01A1 FIREWOOD 1 year $290/Cord, new $210. We deliver everywhere. We give more wood for your $$$'s. Fast dependable service 24/7!Fuel assistance accepted. 978-5012

FIREWOOD: GREEN & 1 YEAR seasoned. Tom Tremblay 603-859-3888

FIREWOOD Seasoned 1 year. $250/cord. Multi cord discount. Call 603-817-7270.

498 Wanted - Merchandise

WANTED USED STAIRLIFTS straight, curved. 603-343-3226.

Real Estate

556 Mobile Homes

Cocheco River Estates
A 55+ Community in Rochester, NH

- Beautiful 3 bedroom, 2 bath, stone fireplace in living room, central AC, screened room with glass, and shed. **$119,900.00**
- Beautiful larger home on corner lot, 3 bedroom, 2 bath, fireplace in living room, central AC, screened room with glass, nice landscaping, and shed. **$107,900.00**
- Larger 3 bedroom, 2 bath home w/some unique features, central AC, screened room with glass, and shed. **$86,900.00**
- 28x48 3 bedroom, 2 bath, central AC, screened room, and shed. **$89,000.00**
- Nice 3 bedroom, 2 bath, eat-in kitchen, central AC, screened room with glass and shed. **$59,900.00**
- Renovated inside, 28x70 with 3 bedrooms, 2 baths, family room, screen room, shed, double lot. **$129,900.00**
- New 28x52, 3 bedroom, 2 baths, black appliance package, central AC, deck, and shed. **$128,500.00**

Toy's Manufactured Housing Inc.
15 Nashoba Drive
Rochester, NH
603•335•2276
www.toysmanufacturedhousing.com

Rentals

604 Apartments - Unfurnished

BERWICK, 1 bedroom heated $950. Or 2 bedroom heated for $1200. (603) 312-8106

BERWICK newly updated 2 bedroom, 2 bath duplex, hookups. $975. Reference 207-252-1447

DOVER 1,2,3 bedrooms $825-$1050 heat & hot water included. No Pets. Call 603-742-8282

604 Apartments - Unfurnished

COUNTRY BROOK
Spacious Sparkling 2 bedroom apts. situated in a lovely country setting across from the Rochester Country Club.
$795/mo. – 332-8444
Professionally managed by JCM Management Co., Inc.
www.countrybrookapartments.com

DOVER 2 BEDROOM heat smart energy star rated. $995-$1095. No dogs. 742-5300

DOVER FAIRFIELD GARDENS
- ✓ 1 & 2 Bedroom Apartments
- ✓ 1 bedroom from $665
- ✓ 2 bedrooms from $715
- ✓ Wall to Wall Carpeting
- ✓ Pool, Tennis Courts
- ✓ Laundry Facilities
- ✓ Hot water included

Open Mon.-Fri., 10-5
603-743-4141

DOVER, large 1 bedroom in town, parking, quiet, no smoking/pets. $780 plus utilities. Call 603-591-1912

DOVER Large clean 2 bedroom, 1st floor, downtown, laundry hookups, shed, parking for 1 vehicle. $800 + utilities. 603-817-3028.

DOVER
large one bedroom on top floor of victorian, very light, lots of storage, oil heat. $775+.
603-749-0555
www.purcellmanagement.com

➡ DOVER ⬅
The Meadows At Dover
New Residents Special
1 bedroom 1 bath @ $775
2 bedrooms starting at $835
Loaded with amenities
~On Site Laundromat~
On U.N.H. Bus Line
1-603-743-3131

MILTON A very nice 2 bedroom townhouse, $800 + utilities, security. No dogs. 603- 335-3039

MILTON, Good Tenant wanted for Sunny 2 bedroom Apartment $795. (978)549-0220

MILTON large 1 bedroom, handicap access, yard, country area. No smoking/pets. 652-4474

OLDE MADBURY LANE APARTMENTS
DOVER
2 Bedroom & Studio Apartments
Prices starting at $695.
Many amenities.
Accepting applications
603-742-2221

ROCHESTER 1 & 2 bedroom apartments. On site laundry, $150-$170 week + security & utilities, no pets. 781-4847.

ROCHESTER 1 Bedroom, Downtown, $600 per month. Home1st 603-793-1175

ROCHESTER 1 bedroom with heat/hot water, $625, cozy, private, clean, parking. 335-0993

ROCHESTER 1st floor, 1 bedroom, yard, new hardwood floors/ paint, $575. 603-264-2687

ROCHESTER 2 bedroom, hookups. $895-$995. Heat & hot water included. 742-5300.

ROCHESTER 3 BEDROOM apartment $1150 a month + utilities. On site laundry. No pets, no smoking. 781-4847.

Rochester, Come see all our changes! renovated 2 bedroom starting at $750+. 603-330-3352

ROCHESTER
Country Setting
So/Field Apartments
1 & 2 bedroom units.
Heat included.
Starting at $700
603-335-3612

➡ ROCHESTER ⬅
NORTHGATE APARTMENTS
Area's largest apartments,
laundry on each floor
Hot water included.
1 bedroom - $650
2 bedroom -
Starting at $725 to $825
Daily 10am-5pm
603-332-0500

ROLLINSFORD 2 to 3 bedrooms, 2nd & 3rd floor, $995 with oil heat, parking, security & references. 312-5551

SANFORD: 28 Jackson St. 2 bedroom, 1 bath apartment. $625/month + utilities. Pets welcome. Call 1-877-402-7077, ext. 398

SOMERSWORTH 2 bedroom, $795+. Washer/dryer hookups. No dogs. 742-5300.

SOMERSWORTH 2 bedroom, off street parking, $775 with hot water. No dogs. 603-867-4093

SOMERSWORTH 3 bedroom, duplex, hookups garage optional, $1175, 603-436-4237

618 Condominiums

ROCHESTER 4 room, 2 bedroom condo. Gas heat, swimming pool. $925/month + utilities. Prescott Agency. 603-742-1331

Rochester heat smart townhouse, 3 bedroom pet friendly $1395+. Call 742-5300.

622 Duplexes - Multiplexes

ROCHESTER 2 BEDROOM duplex, hookups, yard, $900 + utilities. No pets, no smoking. 781-4847.

636 Houses - Unfurnished

NORTHWOOD large newly renovated 3 bedroom mobile with walk out cellar, large fenced in yard. Beach rights to Northwood Lake. $1100 + utilities. Available 4/1. Loren (603)817-3028

656 Mobile - Homes

ROCHESTER spacious 2 bedroom/2 bath $875/ month. No dogs no smoking. Section 8 okay. Call 332-6589

682 Rooms For Rent

STRAFFORD Bow Lake, Huge, quiet, beautiful room in private house. $600. 207-318-3530.

684 Rooms - Furnished

LARGE ROOMS, air, full kitchens, utilities included. Affordable, clean & quiet. Laundry on site. Convenience store / restaurant on site. Strafford Inn / Rochester Residence Inn. Call 603-755-3411.

Services-Repairs

851 Roofing

★★★★★★★★
INTERSTATE ROOFING
ROOF SHOVELING
FULLY INSURED
20 years experience
Free estimates
Prompt service
(603)948-0576

864 Snow Plowing

A1 SNOW PLOWING & SANDING Milton, Farmington, Rochester, Barrington, 603-978-5012

867 Snow Removal

PROFESSIONAL Roof Shoveling. Snow removed from roofs, decks, etc. 343-6918

SNOW Clearing, roof/walkways, Insured. Call Tom Delong & Daughter (603)396-1624.

Transportation

903 Auto Agencies

556 AUTO SALES
BUY HERE PAY HERE
(603) 926-0556
www.556auto.com

907 Autos for Sale

2001 HONDA Civic EX 72k miles, 35 mpg, green, loaded, excellent condition, remote start, security system, $5,600 603-742-0617 larrieupton@hotmail.com

915 Four Wheel Drive

2003 DODGE RAM HD, Fisher plow, 50K miles, lots of new stuff. $11,500 or best offer. (603)285-2205

927 Pickups

1998 FORD F150 4x4: 80K, recent tires & brakes, just inspected. $5500. (603)743-3230

944 Wanted-Automotive

1 ALL UNWANTED Cars & Trucks. Highest Price Paid. Free Towing. Call Cass Towing 692-4884

PAYING $350 & Up
For your unwanted vehicles.
Free pick-up service.
Call for our scale prices.
Buying all types of scrap metal.
Lambert's Auto & Truck
603-948-1900

Recreational

989 Motorcycles

2000H-D LOW RIDER 88 cubic inch, 20k miles - 10K on rebuilt engine, nice bike, $8000. Call (603)285-2205

2008 YAMAHA FZ1 1000 extended warranty. 800 miles. showroom condition with cover. $7800. Call (603) 743-3230

Appendix C
Comments Received During the Public Comment Period and Navy Responses

PUBLIC HEARING FOR THE
PROPOSED PLAN FOR OPERABLE UNIT 4

at
Kittery Municipal Building
200 Rogers Road
Kittery, Maine

on
Wednesday, March 13, 2013
at 8:27 p.m.

Court Reporter:
Karen D. Pomeroy, RDR, CRR

MS. MIDDLETON: Good evening. My name is Liz Middleton on behalf of the Navy.

I'd like to welcome you to the public hearing for the Portsmouth Naval Shipyard Operable Unit 4 Proposed Plan.

We're here tonight to accept formal comments on the Operable Unit 4 Proposed Plan.

So please feel free to use the podium to provide your comments, and please state your name prior to providing those comments.

Thank you.

MR. BOGEN: Good evening. For the record, my name is Doug Bogen. I'm the director of Seacoast Anti-Pollution League. I live in Barrington, New Hampshire, and I'll provide just some general comments about the proposed plan; and then our TAG Consultant, Carolyn Lepage, will follow up with some more detailed comments in a minute.

SAPL is generally pleased with this proposal. We think that it -- it does clean up the offshore. That is certainly our main concern. I recall from, you know, ten or more, 15 years ago that this was one of the biggest concerns of the public.

We had some fairly lengthy RAB meetings, long discussions about the offshore ecological impacts, and so it's great.

You know, obviously it's been a long time coming and we would have liked to have seen it done sooner, but we understand that you had to address the onshore sources and it would take some time to get to this; but again we're glad that it's finally being addressed and that materials are being removed, that we can really call it a cleanup.

We do have some specific concerns again, though, that Carolyn will raise in more detail.

One of our general concerns I want to mention is that we -- as we've said at other hearings and other venues, that we think the Navy needs to give more attention to the issue of climate change, climate disruption, global warming, however you want to call it, and specifically a sea level change and the potential impacts.

There's been a lot of research in the last few years -- again, Carolyn will mention a little more detail on that -- but we think that it really behooves the Navy to give more attention to that and specifically obviously with the offshore, the interfacing of the onshore and the offshore, that's where the wave meets the shore, and with sea level rising, storm surges, and things that we're certainly much more attentive to now than we were even just a year ago, we need to be giving more attention to that.

I would also like to make some comments more about the process and access to documents. At the risk of some redundancy from our previous RAB meeting, I want to state for the record that SAPL is not pleased with the recent changes in policy from the Navy over access to documents.

We don't feel that we had as much time to review the PRAP specifically and previous documents related to this as we would have if we had been under the previous routine of having immediate access and access to written documents as well as technical meetings, being able to discuss these issues face to face.

So we do want to register that concern that -- going forward, that we can rectify the situation and that we not have the situation we have now.

We understand there's more time to review and comment on this specific PRAP, but we do feel that that has been a problem; and we'd like to see some resolution to it.

So I think that's all I'll say at this point; but

I'd like to turn it over to Carolyn Lepage, our TAG consultant.

MS. LEPAGE: My name is Carolyn Lepage.

I'm a Maine certified geologist from Auburn, Maine; and I serve under contract as the technical advisor to the Seacoast Anti-Pollution League, also known as SAPL.

The following comments regarding the February 2013 proposed plan for Operable Unit 4 are presented on behalf of SAPL.

Support for the preferred remedy. SAPL supports the remediation of contaminated sediments in the areas offshore of the Portsmouth Naval Shipyard as described in the February 2013 Proposed Plan for Operable Unit 4.

The removal of toxins at locations MS-01, 03, 04, and 12 should improve the environmental quality offshore in the long run.

However, while SAPL supports the removal of contaminated sediments from the four locations, SAPL has questions and concerns about the Navy's preferred alternative as follows:

No. 1, confirmation sampling is crucial.

The PRAP states that once the final remedies are implemented for OU4, the interim offshore monitoring will be discontinued.

Since there will no longer be any monitoring program in place, it is crucial that confirmation sampling, performed in conjunction with removal action, be sufficient to demonstrate that all contamination that exceeds clean-up goals has been removed at each of the four locations.

No. 2, potential for offshore contamination resulting from onshore actions.

Given that the interim offshore monitoring program will no longer be conducted, what contingency plan does the Navy have for addressing contamination of offshore areas caused by activities conducted onshore?

For example, page 3 of the PRAP states that the excavation of contaminated soils adjacent to Jamaica Cove resulted in the release of contaminants to sediment offshore of Jamaica Cove.

How will the Navy address potential impact to ecological receptors in offshore areas adjacent to remedial or similar activities being conducted onshore?

No. 3, maintaining the integrity of shoreline structures.

The introduction section of the PRAP describes how the installation of erosion control structures at several sites has resulted in the reduction of contaminant concentrations or prevention of contaminated sediment accumulation in the offshore. Specifically, OU7, OU3, and OU2. Therefore, these structures are integral to the Navy's proposed remedy for OU4 as they prevent erosion and migration of soil contamination from the sites into the adjacent river.

SAPL believes that frequent inspection and evaluation will be needed to ensure that any structural deterioration is fixed before failure occurs.

What are the Navy's plans for inspection and repairs?

How will rising sea level be factored into these plans?

Should repairs or replacement become necessary, how will the Navy prevent erosion and migration of site soils and contamination into the offshore?

No. 4, sea level rise.

SAPL again expresses its concern into the -- with the effect of rising sea level on the contamination located at various sites around the shipyard as well as on the remedial measures taken to clean up these sites.

A recent report from Carbon Solutions New England at the University of New Hampshire entitled, Climate

Change in the Piscataqua, slash, Great Bay Region, Past, Present, and Future concludes that, quote, we can expect the 100-year flood height to increase several feet over the next 90 years, end quote, which will result in more severe flooding in coastal New Hampshire in the future.

The effect of such an increase on the Great Bay area can be observed at a website developed by Princeton University climate scientists sealevel.climatecentral.org/surgingseas; and I have the complete website -- the complete link if anybody wants it.

Rising sea level will alter current groundwater/surface water systems and affect the stability of shoreline structures. The remedy for OU4 relies on the integrity of shoreline structures used to maintain stability along the shoreline slopes and to prevent erosion and further migration of waste and contaminated soil that will remain at sites onshore.

How was rising sea level considered in the development of potential remedies for OU4 and in the selection of the Navy's preferred alternative?

What are the effects of rising sea level and increasing frequency and/or severity of storm events on the proposed remedy and how have they been evaluated?

What range of sea level change was considered?

What are the potential future impacts to the Navy's preferred alternative as sea level rises?

How has the Navy planned to deal with potential future impacts?

No. 5, impact of shipyard closure.

What will happen if the shipyard closes and the Navy is no longer on the property to keep an eye on various onshore sites that could potentially impact OU4?

Recent experience at another Navy facility in Maine that recently closed has shown that security measures for even the most dangerous sites will no longer be maintained at a high level once a base closes.

In the event of closure, how will the Navy ensure that there are no adverse impacts on OU4 offshore areas as a result of activities or actions on the former shipyard property?

For example, how will the integrity of shoreline erosion control measures such as those cited in the PRAP for OU2, OU3, and OU7 be maintained to prevent migration of contaminants to the offshore?

No. 6, new contaminants or sources of contamination.

What contingencies or plans does the Navy have for possible future offshore monitoring needs for the following situations:

A, detection of, quote, emergent contaminants, end quote, or other, quote, new, end quote, contaminants at either onshore or offshore sites; B, ongoing investigations reveal new potential source or sources of contamination that could affect the offshore environment?

Thank you.

MS. MIDDLETON: Are there any other comments?

(No response.)

MS. MIDDLETON: If not, then thank you for joining us tonight.

(Conclusion of proceedings at 8:39 p.m. this date.)

CERTIFICATE

I, Karen D. Pomeroy, a Registered Diplomate Reporter and Certified Realtime Reporter, do hereby certify that within transcription is a true and accurate record, to the best of my knowledge, skills and ability, of the proceedings.

I further certify that I am not related to any of the parties in this matter by blood or marriage and that I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office this 15th day of March, 2013.

Karen D. Pomeroy

Karen D. Pomeroy, RDR, CRR

SUBSCRIBED AND SWORN TO
before me this 25th day of
March, A.D., 2013

Laura Davis

OFFICIAL SEAL
LAURA DAVIS
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES: 10/19/16

NOTARY PUBLIC

Lepage Environmental Services, Inc.

P. O. Box 1195 • Auburn, Maine • 04211-1195 • 207-777-1049

March 27, 2011

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Portsmouth, NH 03804-5000

Subject: February 2013 *Proposed Plan for Operable Unit 4*

Dear Ms. Eddy:

This letter is submitted as requested by and on behalf of the Seacoast Anti-Pollution League (SAPL) regarding the February 2013 *Proposed Plan for Operable Unit 4, Portsmouth Naval Shipyard, Kittery, Maine* (the Proposed Plan). Most of the comments below reflect the oral comments presented on behalf of, and with input from, SAPL members at the March 13, 2013, Public Hearing held at the Kittery Town Hall.

Support for the Preferred Remedy

SAPL supports the remediation of contaminated sediments in areas offshore of the Portsmouth Naval Shipyard as described in the February 2013 *Proposed Plan for Operable Unit 4*. The removal of toxics at locations MS-01, 03, 04, and 12 should improve the environmental quality off shore in the long run. However, while SAPL supports the removal of contaminated sediments from the four locations, SAPL has questions and concerns about the Navy's preferred alternative as follows:

Confirmation Sampling is Crucial

The Proposed Plan states that once the final remedies are implemented for OU4, the interim offshore monitoring will be discontinued. Since there will no longer be any monitoring program in place, it is crucial that confirmation sampling performed in conjunction with the removal action be sufficient to demonstrated that <u>all</u> contamination that exceeds cleanup goals has been removed at each of the four locations.

Maintaining the Integrity of Shoreline Structures

The Introduction section of the Proposed Plan describes how the installation of erosion control structures at several sites has resulted in the reduction of contaminant concentrations or prevention of contaminated-sediment accumulation in the offshore. [Site 32 (OU7), OU3, OU2] Therefore, these structures are integral to the Navy's proposed remedy for OU4 as they prevent erosion and migration of soil and contamination from the sites into the adjacent river. SAPL believes that frequent inspection and evaluation will be needed to ensure that any structural deterioration is fixed before failure occurs. What are the Navy's plans for inspections and repairs? How will rising sea level be factored into the plans? Should repairs or replacement become necessary, how will the Navy prevent erosion and migration of site soils and contamination into the offshore?

Potential for Offshore Contamination Resulting From Onshore Actions

The Navy is proposing to remediate four offshore locations, but not ten other locations based on the results of the offshore monitoring conducted from 1999 through 2011. Remedial efforts and other actions conducted on-shore, such is no longer discharging via the OU5 industrial waste outfalls and improving shoreline erosion control structures at OU2, have also benefited the offshore environment. However, on-shore activities in the future may spread contamination to offshore areas again. For example, page 3 of the Proposed Plan states that the excavation of contaminated soils adjacent to Jamaica Cove resulted in the release of contaminants to sediment offshore of Jamaica Cove.

Given that the interim offshore monitoring program will no longer be conducted, what contingency plan does the Navy have for addressing contamination of offshore areas caused by activities conducted on-shore? How will the Navy address potential impacts to ecological receptors in offshore areas adjacent to remedial or other activities being conducted on-shore?

Sea Level Rise

SAPL again expresses its concern with the effect of rising sea level on the contamination located at various sites around the Shipyard, as well as on the remedial measures taken to clean up the sites. A recent report from Carbon Solutions New England at the University of New Hampshire, entitled "*Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future*" concludes that "we can expect the 100-year flood height to increase several feet over the next 90 years", which will result in more severe flooding in coastal New Hampshire in the future. The effect of such an increase on the Great Bay area can be observed at a website developed by Princeton University climate scientists, sealevel.climatecentral.org/surgingseas.

[http://sealevel.climatecentral.org/surgingseas/place/states/NH#center=14/43.0761/-70.7407&surge=3&show=cities]

Rising sea level will alter the current groundwater/surface water system and affect the stability of shoreline structures. The remedy for OU4 relies on the integrity of shoreline structures to maintain stability along the shoreline slopes and to prevent erosion and further migration of the waste and contaminated soil that will remain at sites on shore.

How was rising sea level considered in the development of potential remedies for OU4, and in the selection of the Navy's preferred alternative? What are the effects of rising sea level and increasing frequency and/or severity of storm events on the proposed remedy and how have they been evaluated? What range of sea-level change was considered? What are the potential future impacts to the Navy's preferred alternative as sea level rises? How has the Navy planned to deal with the potential future impacts?

Impact of Shipyard Closure

What will happen if the Shipyard closes and the Navy is no longer on the property to keep an eye on various on-shore sites that could potentially impact OU4? Recent experience at another Navy facility in Maine that recently closed has shown that security measures for even the most dangerous sites will no longer be maintained at a high level once a base closes. In the event of closure, how will the Navy ensure that there are no adverse impacts on OU4 offshore areas as a result of activities or actions on the former Shipyard property? For example, how will the integrity of shoreline erosion control measures (such as those cited in the Proposed Plan for OU2, OU3, and OU7) be maintained to prevent migration of contaminants to the offshore?

New Contaminants or Sources of Contamination

What contingencies or plans does the Navy have for possible future offshore monitoring needs for the following situations:

- Detection of "emerging contaminants", or other 'new' contaminants at either on- or off-shore sites.

- On-going investigations reveal new potential source(s) of contamination that could affect the off-shore environment.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Carolyn A. Lepage

Carolyn A. Lepage, C.G. & P.G.
President
State of Maine Certified Geologist No. GE202

cc: Doug Bogen, SAPL
Elizabeth Middleton, NAVFAC MIDLANT
Iver McLeod, MEDEP
Matthew Audet, EPA
Deborah Cohen, TetraTech

105OU4PRAP Comments27.MR3

TABLE C-1
RESPONSES TO COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN FOR OPERABLE UNIT 4, PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Oral comments during the March 13, 2013 public hearing and written comments dated March 27, 2013, were received from one community organization, Seacoast Anti-Pollution League (SAPL), on the February 2013 Proposed Plan for Operable Unit (OU) 4. The SAPL representative, who is also a Restoration Advisory Board (RAB) member, and SAPL's Technical Assistance Grant (TAG) Consultant provided comments at the public hearing. No changes to the remedy, as originally identified in the Proposed Plan, were necessary based on comments received during the public comment period. A summary of the comments received and the Navy's responses to these comments are provided in the table herein.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
SAPL indicated support for removal of contaminated sediment from MS-01, MS-03, MS-04, and MS-12.	Comment noted.
SAPL indicated that the Navy needs to give more attention to the issue of climate change, specifically sea level rising. SAPL is concerned with the effect of rising sea level on the offshore area and the interface between onshore and offshore area and potential impact to the stability of shoreline structures. SAPL asked how sea level was considered in the development and selection of remedies for OU4, what the potential future impacts may be to the Navy's preferred remedy as sea level rises, and how the Navy will address potential future impacts from sea level rise at OU4.	Sea level rise does not affect OU4 because sediment contamination at OU4 is within the portion of the offshore below high tide. Change in sea level change also would not affect OU4 in the future because OU4 contamination will be removed as part of the remedy. Therefore, no consideration was given to potential sea level change as part of OU4. OU4 is the nearshore offshore area adjacent to PNS that may have been affected by past releases from onshore Installation Restoration (IR) Program sites. The potential sources of contamination to the offshore from these IR Program sites have been controlled through various remedial and removal actions. Future potential for migration of contamination from onshore IR Program sites to the offshore area is being addressed as part of the specific onshore IR Program sites (or OUs). As the Navy has indicated in previous responses to similar questions regarding sea level rise, evaluations of the potential migration of contamination from onshore IR Program site soils to groundwater have been conducted. The evaluations assumed worst-case conditions, assuming that the highest contamination was directly in contact with groundwater and was near the shoreline. Therefore, changes in sea level would not change the conclusions of the evaluation. In addition, five-year reviews will be required for sites where contamination remains in excess of levels that allow for unlimited use and unrestricted exposure to ensure that the remedy remains protective of human health and the environment in the future. Changes in site conditions that could affect the protectiveness of the remedy are evaluated as part of the five-year review process. Please also see the Navy's response to SAPL's comment regarding future potential migration of contamination from onshore to offshore.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
SAPL commented on the access to documents and time for review of the Proposed Plan and previous documents.	The Navy provided a 30-day public comment period in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR § 300.430(f)(3)(c)), which indicates that a reasonable opportunity of not less than 30 calendar days must be provided for submission of written and oral comments on the Proposed Plan and the supporting analysis and information located in the Information Repository. The public comment period on the Proposed Plan for OU4 was held from February 27 to March 28, 2013. Before the start of the public comment period, the Proposed Plan for OU4 and documents supporting the Proposed Plan were made available in the Information Repository at Rice Public Library in Kittery, Maine and Portsmouth Public Library in Portsmouth, New Hampshire. The Proposed Plan also provides information to access the documents through the Navy's public website. In addition, the Navy presented the draft Proposed Plan at the December 2012 RAB meeting, where SAPL and SAPL's TAG Consultant and other people attending the RAB meeting had an opportunity to hear about the Navy's draft plans and to ask questions about the plan. Documents supporting the Proposed Plan, including the Feasibility Study (FS) Report and documents related to the Interim Offshore Monitoring Program were also presented at RAB meetings.
SAPL indicated that confirmation sampling was necessary to demonstrate that contamination has been removed at the four monitoring stations.	Sampling is included in the preferred alternatives, as discussed in the description on page 16 of the Proposed Plan. The Navy will conduct sampling to make sure that contaminated sediment is removed such that the RAO and cleanup levels are met. The appropriate remedial action documents will specify the requirements for sampling at the four monitoring stations.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
SAPL indicated concern for the potential for offshore contamination resulting from onshore actions and what contingency plans the Navy has to address this potential contamination.	Potential impacts to the offshore area from onshore remedial actions are addressed as part of the specific onshore remedies. The remedial action documents (e.g., design and/or work plan) are developed to specify the activities that are necessary to provide adequate protection to human health and the environment. Generally the Remedial Action Work Plan (RAWP) discusses the specific activities that will be conducted to prevent contaminant migration, including erosion and sedimentation, during remedial action construction activities and site restoration requirements. Contingency action, as needed, would be discussed in the RAWP. Completion of the remedial action is documented in a report that discusses the specific activities conducted and that the remedial action objectives (RAOs) have been met. The five-year review subsequent to the completion of construction also evaluates whether the remedy has met the RAOs and whether the implemented remedy is protective of human health and the environment. For remedies that require long-term management, the long-term management plan provides the necessary activities for inspection and routine maintenance. Non-routine maintenance that is identified based on the inspections would require a separate work plan to address the specific activities as part of the maintenance work.
SAPL indicated concern with the long-term integrity of the shoreline stabilization features because there has been past erosion along the shoreline of the sites. SAPL asked what the Navy's plans were for inspection and repair of the structures, how rising sea level will be factored into the plans, and how the Navy will prevent erosion and migration of contamination if repairs or replacement of the structures is necessary. SAPL believes that frequent inspections to identify structural deterioration will be necessary.	Shoreline stabilization features and control of future potential erosion to the offshore are addressed as part of the appropriate onshore IR Program site (or OU). Protection from potential future contaminant migration from these onshore areas is not part of the OU4 remedy. With the removal of the contaminated sediment as part of the OU4 remedy, long-term management, operations and maintenance, and five-year reviews will not be required. The shoreline structures at OU3 (Site 8), OU2 (Sites 6 and 29), and OU7 (Site 32) were installed as part of remedial or removal actions conducted at these OUs. The specific requirements for inspection and repair of the shoreline structures and necessary actions are or will be provided in the long-term management plans for these OUs. Also, for remedies where contamination remains at concentrations that do not allow for unlimited use and unrestricted exposure, the Navy is required to conduct five-year reviews to assess the continued protectiveness of the remedy. Inspections would identify any significant changes in site conditions, such as significant changes in water levels. In addition, five-year reviews will be required to ensure that the remedy remains protective of human health and the environment in the future. Changes in site conditions that could affect the protectiveness of the remedy are also evaluated as part of the five-year review process. If repairs or replacement become necessary in the future, the Navy will follow all applicable or relevant and appropriate requirements (ARARs) to prevent erosion and migration of site soils and contamination during construction.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
SAPL asked what happens if the Shipyard closes and the Navy is no longer on site to inspect various onshore sites that could potentially impact OU4.	The contaminated sediment will be removed from OU4 to meet the RAO so that land use controls (LUCs), operation and maintenance (O&M), long-term monitoring, and five-year reviews will not be required. Therefore, there are no concerns for OU4 if the Shipyard were to close. For the onshore areas, as provided in previous responses to similar questions from SAPL regarding hypothetical Shipyard closure, the LUCs Remedial Design (LUC RD) indicates procedures pertaining to changes in land use, including property transfer. The deed associated with any future transfer of property would require continued implementation of the LUCs, O&M, and other long-term monitoring requirements. The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy will retain ultimate responsibility for remedy integrity.
SAPL asked what contingencies or plans does the Navy have for possible future offshore monitoring if new contaminants (e.g., emerging contaminants) or new sources of contamination that could affect the offshore environment are identified.	The Navy makes decisions on investigating emerging contaminants based on site-specific conditions. There needs to be a reason to investigate a specific emerging contaminant. For example, perfluorinated compounds (PFCs) used in firefighting foams would not be investigated at the Shipyard because there is not a historical basis for pursuing PFCs at PNS. At the Shipyard, historical filling and contamination of metals and PAHs are the primary issues for the IR Program sites at PNS. Investigation of OU4 began in the 1980s and since then various investigations and monitoring have been conducted. These activities have included sampling across the area offshore of PNS, and not only in areas offshore of IR Program sites. In particular, based on the Interim Offshore Monitoring Program, which has been conducted since 1999, only sediment at MS-01, MS-03, MS-04, and MS-12 was found to have unacceptable chemical concentrations that require remediation. While the Navy does not anticipate finding any new IR Program sites that could impact the offshore, the Navy in consultation with USEPA would investigate newly identified IR Program sites, if present.

Appendix D
Human Health and Ecological Risk Tables

Appendix D.1

TABLE 3-1
MATRIX OF POTENTIAL HUMAN EXPOSURE PATHWAYS RESULTING
FROM EXPOSURES TO OFF-SHORE MEDIA

Potentially Exposed Population	Potential Exposure Route and Exposure Point	Potential Pathway Selected for Evaluation	Reason for Selection or Exclusion	Data Needs (Groundwater, Surface water, Sediment, Soil, Air)
Current Use, Off-Shore Impacts on Human Health				
Surface Water				
	Ingestion of surface water from river while swimming, wading and fishing in the river.	Yes	There is a potential for area residents to ingest surface water while swimming, wading, and fishing.	Surface Water from Estuary
	Dermal contact with surface water from river while swimming, wading and fishing in the river.	Yes	There is a potential for exposures from dermal contact with surface water while swimming, wading and fishing; however surface water was analyzed for inorganics only.	Surface Water from Estuary
Sediment				
	Incidental ingestion of sediments from the river while swimming, wading and fishing.	Yes	There is a potential for residents to ingest sediments from the river while swimming, wading, and fishing.	Sediment
	Dermal contact with sediments in the river while swimming, wading and fishing.	Yes	There is a potential for residents to ingest sediments from the river while swimming, wading and fishing.	Sediment
Food				
	Ingestion of lobster tail, whole lobster, mussels, and flounder fillet.	Yes	Currently, area residents and fishermen catch fish and shellfish from the river.	Biota tissue analysis

TABLE 3-2

Consumption of Locally Caught Lobster Tail Flesh
Recreational Exposures, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value
IR	=	.054 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-2
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	6.7292	18.2970	0.054	350	30	1	70	25,550	10,950	2.13E-03	5.80E-03	4.98E-03	1.35E-02
ARSENIC	2.7000	5.2600	0.054	350	30	1	70	25,550	10,950	8.56E-04	1.67E-03	2.00E-03	3.89E-03
CADMIUM	0.0059	0.0109	0.054	350	30	1	70	25,550	10,950	1.87E-06	3.46E-06	4.37E-06	8.06E-06
CHROMIUM	0.1717	0.2470	0.054	350	30	1	70	25,550	10,950	5.44E-05	7.83E-05	1.27E-04	1.83E-04
COPPER	5.3747	5.8504	0.054	350	30	1	70	25,550	10,950	1.70E-03	1.85E-03	3.98E-03	4.33E-03
IRON	16.0517	54.9100	0.054	350	30	1	70	25,550	10,950	5.09E-03	1.74E-02	1.19E-02	4.06E-02
LEAD	0.0402	0.1160	0.054	350	30	1	70	25,550	10,950	1.27E-05	3.68E-05	2.97E-05	8.58E-05
MANGANESE	0.6863	1.0633	0.054	350	30	1	70	25,550	10,950	2.18E-04	3.37E-04	5.08E-04	7.87E-04
MERCURY	0.2716	0.3488	0.054	350	30	1	70	25,550	10,950	8.61E-05	1.11E-04	2.01E-04	2.58E-04
NICKEL	0.1181	0.2563	0.054	350	30	1	70	25,550	10,950	3.75E-05	8.13E-05	8.74E-05	1.90E-04
SILVER	0.1442	0.2260	0.054	350	30	1	70	25,550	10,950	4.57E-05	7.16E-05	1.07E-04	1.67E-04
ZINC	17.0493	20.0100	0.054	350	30	1	70	25,550	10,950	5.41E-03	6.34E-03	1.26E-02	1.48E-02
PESTICIDES													
ALDRIN	0.00017	0.00036	0.054	350	30	1	70	25,550	10,950	5.39E-08	1.13E-07	1.26E-07	2.64E-07
ALPHA-CHLORDANE	0.00014	0.00023	0.054	350	30	1	70	25,550	10,950	4.47E-08	7.28E-08	1.04E-07	1.70E-07
HEPTACHLOR	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.80E-08	4.88E-08	8.88E-08	1.14E-07
HEPTACHLOR EPOXIDE	0.00017	0.00049	0.054	350	30	1	70	25,550	10,950	5.50E-08	1.56E-07	1.28E-07	3.65E-07
HEXACHLOROBENZENE	0.00042	0.00059	0.054	350	30	1	70	25,550	10,950	1.33E-07	1.88E-07	3.11E-07	4.39E-07
LINDANE (GAMMA-BHC)	0.00016	0.00045	0.054	350	30	1	70	25,550	10,950	5.00E-08	1.44E-07	1.17E-07	3.35E-07
MIREX	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	3.99E-08	4.88E-08	9.30E-08	1.14E-07
TRANS-NONACHLOR	0.00016	0.00026	0.054	350	30	1	70	25,650	10,950	5.07E-08	8.10E-08	1.18E-07	1.89E-07
o,p'-DDD	0.00017	0.00035	0.054	350	30	1	70	25,550	10,950	5.42E-08	1.10E-07	1.27E-07	2.56E-07
o,p'-DDE	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	4.12E-08	4.88E-08	9.62E-08	1.14E-07
o,p'-DDT	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	4.12E-08	4.88E-08	9.62E-08	1.14E-07
p,p'-DDD	0.00019	0.00034	0.054	350	30	1	70	25,550	10,950	6.02E-08	1.07E-07	1.41E-07	2.50E-07
p,p'-DDE	0.00074	0.00134	0.054	350	30	1	70	25,550	10,950	2.35E-07	4.26E-07	5.47E-07	9.94E-07
p,p'-DDT	0.00050	0.00217	0.054	350	30	1	70	25,550	10,950	1.59E-07	6.87E-07	3.70E-07	1.60E-06

TABLE 3-2
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.01543	0.08215	0.054	350	30	1	70	25,550	10,950	4.89E-06	2.60E-05	1.14E-05	6.08E-05
BENZO(A)ANTHRACENE	0.03637	0.15635	0.054	350	30	1	70	25,550	10,950	1.15E-05	4.96E-05	2.69E-05	1.16E-04
BENZO(A)PYRENE	0.03893	0.15900	0.054	350	30	1	70	25,550	10,950	1.23E-05	5.04E-05	2.88E-05	1.18E-04
BENZO(E)PYRENE	0.04860	0.18020	0.054	350	30	1	70	25,550	10,950	1.54E-05	5.71E-05	3.60E-05	1.33E-04
BENZO(G,H,I)PERYLENE	0.01071	0.03419	0.054	350	30	1	70	25,550	10,950	3.40E-06	1.08E-05	7.92E-06	2.53E-05
CHRYSENE	0.06258	0.27825	0.054	350	30	1	70	25,550	10,950	1.98E-05	8.82E-05	4.63E-05	2.06E-04
FLUORANTHENE	0.19187	0.84800	0.054	350	30	1	70	25,650	10,950	6.08E-05	2.69E-04	1.42E-04	6.27E-04
FLUORENE	0.01467	0.06890	0.054	350	30	1	70	25,550	10,950	4.65E-06	2.18E-05	1.09E-05	5.10E-05
INDENO(1,2,3-CD)PYRENE	0.01047	0.03472	0.054	350	30	1	70	25,550	10,950	3.32E-06	1.10E-05	7.75E-06	2.57E-05
PERYLENE	0.01706	0.05565	0.054	350	30	1	70	25,550	10,950	5.41E-06	1.76E-05	1.26E-05	4.12E-05
PHENANTHRENE	0.06516	0.33390	0.054	350	30	1	70	25,550	10,950	2.07E-05	1.06E-04	4.82E-05	2.47E-04
PYRENE	0.16044	0.68900	0.054	350	30	1	70	25,550	10,950	5.09E-05	2.18E-04	1.19E-04	5.10E-04
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01341	0.02420	0.054	350	30	1	70	25,550	10,950	4.25E-06	7.67E-06	9.92E-06	1.79E-05

TABLE 3-3
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	7.7685	12.0652	0.054	350	30	1	70	25,550	10,950	2.46E-03	3.82E-03	5.75E-03	8.92E-03
ARSENIC	1.3000	1.8200	0.054	350	30	1	70	25,550	10,950	4.12E-04	5.77E-04	9.62E-04	1.35E-03
CADMIUM	0.0066	0.0109	0.054	350	30	1	70	25,550	10,950	2.10E-06	3.46E-06	4.90E-06	8.06E-06
CHROMIUM	0.1866	0.1887	0.054	350	30	1	70	25,550	10,950	5.92E-05	5.98E-05	1.38E-04	1.40E-04
COPPER	5.4088	5.8483	0.054	350	30	1	70	25,550	10,950	1.71E-03	1.85E-03	4.00E-03	4.33E-03
IRON	15.2400	21.1400	0.054	350	30	1	70	25,550	10,950	4.83E-03	6.70E-03	1.13E-02	1.56E-02
LEAD	0.0415	0.0440	0.054	350	30	1	70	25,550	10,950	1.32E-05	1.39E-05	3.07E-05	3.25E-05
MANGANESE	0.8346	1.0633	0.054	350	30	1	70	25,550	10,950	2.65E-04	3.37E-04	6.17E-04	7.87E-04
MERCURY	0.2322	0.2322	0.054	350	30	1	70	25,550	10,950	7.36E-05	7.36E-05	1.72E-04	1.72E-04
NICKEL	0.2052	0.2563	0.054	350	30	1	70	25,550	10,950	6.51E-05	8.13E-05	1.52E-04	1.90E-04
SILVER	0.1586	0.2260	0.054	350	30	1	70	25,550	10,950	5.03E-05	7.16E-05	1.17E-04	1.67E-04
ZINC	15.0195	15.8910	0.054	350	30	1	70	25,550	10,950	4.76E-03	5.04E-03	1.11E-02	1.18E-02
PESTICIDES													
ALDRIN	0.00028	0.00047	0.054	350	30	1	70	25,550	10,950	8.94E-08	1.49E-07	2.09E-07	3.48E-07
ALPHA-CHLORDANE	0.00010	0.00015	0.054	350	30	1	70	25,550	10,950	3.04E-08	4.60E-08	7.10E-08	1.07E-07
HEPTACHLOR	0.00008	0.00015	0.054	350	30	1	70	25,550	10,950	2.38E-08	4.63E-08	5.55E-08	1.08E-07
HEPTACHLOR EPOXIDE	0.00011	0.00020	0.054	350	30	1	70	25,550	10,950	3.52E-08	6.40E-08	8.21E-08	1.49E-07
HEXACHLOROBENZENE	0.00016	0.00019	0.054	350	30	1	70	25,550	10,950	4.95E-08	6.12E-08	1.15E-07	1.43E-07
LINDANE (GAMMA-BHC)	0.00008	0.00009	0.054	350	30	1	70	25,550	10,950	2.63E-08	2.98E-08	6.14E-08	6.95E-08
MIREX	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.87E-08	4.63E-08	9.02E-08	1.08E-07
TRANS-NONACHLOR	0.00016	0.00018	0.054	350	30	1	70	25,550	10,950	5.01E-08	5.67E-08	1.17E-07	1.32E-07
o,p'-DDD	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	4.09E-08	4.63E-08	9.54E-08	1.08E-07
o,p'-DDE	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	4.09E-08	4.63E-08	9.54E-08	1.08E-07
o,p'-DDT	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	4.09E-08	4.63E-08	9.54E-08	1.08E-07
p,p'-DDD	0.00016	0.00018	0.054	350	30	1	70	25,550	10,950	5.14E-08	5.67E-08	1.20E-07	1.32E-07
p,p'-DDE	0.00042	0.00056	0.054	350	30	1	70	25,550	10,950	1.33E-07	1.77E-07	3.09E-07	4.12E-07
p,p'-DDT	0.00019	0.00024	0.054	350	30	1	70	25,550	10,950	6.09E-08	7.55E-08	1.42E-07	1.76E-07

TABLE 3-3
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.04213	0.08215	0.054	350	30	1	70	25,550	10,950	1.34E-05	2.60E-05	3.12E-05	6.08E-05
BENZO(A)ANTHRACENE	0.09604	0.15635	0.054	350	30	1	70	25,550	10,950	3.04E-05	4.96E-05	7.10E-05	1.16E-04
BENZO(A)PYRENE	0.09830	0.15900	0.054	350	30	1	70	25,550	10,950	3.12E-05	5.04E-05	7.27E-05	1.18E-04
BENZO(E)PYRENE	0.11360	0.18020	0.054	350	30	1	70	25,550	10,950	3.60E-05	5.71E-05	8.40E-05	1.33E-04
BENZO(G,H,I)PERYLENE	0.02273	0.03419	0.054	350	30	1	70	25,550	10,950	7.21E-06	1.08E-05	1.68E-05	2.53E-05
CHRYSENE	0.16498	0.27825	0.054	350	30	1	70	25,550	10,950	5.23E-05	8.82E-05	1.22E-04	2.06E-04
FLUORANTHENE	0.49450	0.84800	0.054	350	30	1	70	25,550	10,950	1.57E-04	2.69E-04	3.66E-04	6.27E-04
FLUORENE	0.03504	0.06890	0.054	350	30	1	70	25,550	10,950	1.11E-05	2.18E-05	2.59E-05	5.10E-05
INDENO(1,2,3-CD)PYRENE	0.02347	0.03472	0.054	350	30	1	70	25,550	10,950	7.44E-06	1.10E-05	1.74E-05	2.57E-05
PERYLENE	0.03793	0.05565	0.054	350	30	1	70	25,550	10,950	1.20E-05	1.76E-05	2.81E-05	4.12E-05
PHENANTHRENE	0.17776	0.33390	0.054	350	30	1	70	25,550	10,950	5.64E-05	1.06E-04	1.31E-04	2.47E-04
PYRENE	0.40090	0.68900	0.054	350	30	1	70	25,550	10,950	1.27E-04	2.18E-04	2.97E-04	5.10E-04
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.00860	0.00890	0.054	350	30	1	70	25,550	10,950	2.73E-06	2.82E-06	6.36E-06	6.58E-06

TABLE 3-4
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	2.2133	2.5338	0.054	350	30	1	70	25,550	10,950	7.02E-04	8.03E-04	1.64E-03	1.87E-03
ARSENIC	3.9050	5.2600	0.054	350	30	1	70	25,550	10,950	1.24E-03	1.67E-03	2.89E-03	3.89E-03
CADMIUM	0.0062	0.0062	0.054	350	30	1	70	25,550	10,950	1.97E-06	1.97E-06	4.59E-06	4.59E-06
CHROMIUM	0.1397	0.1442	0.054	350	30	1	70	25,550	10,950	4.43E-05	4.57E-05	1.03E-04	1.07E-04
COPPER	5.7748	5.8504	0.054	350	30	1	70	25,550	10,950	1.83E-03	1.85E-03	4.27E-03	4.33E-03
IRON	3.4750	4.7200	0.054	350	30	1	70	25,550	10,950	1.10E-03	1.50E-03	2.57E-03	3.49E-03
LEAD	0.0165	0.0210	0.054	350	30	1	70	25,550	10,950	5.23E-06	6.66E-06	1.22E-05	1.55E-05
MANGANESE	0.5392	0.7488	0.054	350	30	1	70	25,550	10,950	1.71E-04	2.37E-04	3.99E-04	5.54E-04
MERCURY	0.3001	0.3090	0.054	350	30	1	70	25,550	10,950	9.51E-05	9.80E-05	2.22E-04	2.29E-04
NICKEL	0.0421	0.0666	0.054	350	30	1	70	25,550	10,950	1.33E-05	2.11E-05	3.11E-05	4.93E-05
SILVER	0.1047	0.1414	0.054	350	30	1	70	25,550	10,950	3.32E-05	4.48E-05	7.74E-05	1.05E-04
ZINC	19.5530	20.0100	0.054	350	30	1	70	25,550	10,950	6.20E-03	6.34E-03	1.45E-02	1.48E-02
PESTICIDES													
ALDRIN	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
ALPHA-CHLORDANE	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
HEPTACHLOR	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
HEPTACHLOR EPOXIDE	0.00032	0.00048	0.054	350	30	1	70	25,550	10,950	9.99E-08	1.53E-07	2.33E-07	3.57E-07
HEXACHLOROBENZENE	0.00059	0.00059 *	0.054	350	30	1	70	25,550	10,950	1.86E-07	1.86E-07	4.35E-07	4.35E-07
LINDANE (GAMMA-BHC)	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
MIREX	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
TRANS-NONACHLOR	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
o,p'-DDD	0.00025	0.00035	0.054	350	30	1	70	25,550	10,950	7.82E-08	1.10E-07	1.83E-07	2.56E-07
o,p'-DDE	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
o,p'-DDT	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
p,p'-DDD	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07
p,p'-DDE	0.00118	0.00134	0.054	350	30	1	70	25,550	10,950	3.73E-07	4.26E-07	8.70E-07	9.94E-07
p,p'-DDT	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.66E-08	4.66E-08	1.09E-07	1.09E-07

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-4
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
BENZO(A)PYRENE	0.00294	0.00399	0.054	350	30	1	70	25,550	10,950	9.32E-07	1.26E-06	2.17E-06	2.95E-06
FLUORANTHENE	0.00562	0.00935	0.054	350	30	1	70	25,550	10,950	1.78E-06	2.96E-06	4.16E-06	6.91E-06
PHENANTHRENE	0.00200	0.00273	0.054	350	30	1	70	25,550	10,950	6.32E-07	8.65E-07	1.48E-06	2.02E-06
PYRENE	0.00410	0.00630	0.054	350	30	1	70	25,550	10,950	1.30E-06	2.00E-06	3.03E-06	4.66E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01756	0.02417	0.054	350	30	1	70	25,550	10,950	5.57E-06	7.66E-06	1.30E-05	1.79E-05

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-5
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	10.2058	18.2970	0.054	350	30	1	70	25,550	10,950	3.24E-03	5.80E-03	7.55E-03	1.35E-02
ARSENIC	2.8950	2.9200	0.054	350	30	1	70	25,550	10,950	9.18E-04	9.26E-04	2.14E-03	2.16E-03
CADMIUM	0.0049	0.0076	0.054	350	30	1	70	25,550	10,950	1.55E-06	2.41E-06	3.62E-06	5.62E-06
CHROMIUM	0.1889	0.2470	0.054	350	30	1	70	25,550	10,950	5.99E-05	7.83E-05	1.40E-04	1.83E-04
COPPER	4.9405	5.7770	0.054	350	30	1	70	25,550	10,950	1.57E-03	1.83E-03	3.65E-03	4.27E-03
IRON	29.4400	54.9100	0.054	350	30	1	70	25,550	10,950	9.33E-03	1.74E-02	2.18E-02	4.06E-02
LEAD	0.0625	0.1160	0.054	350	30	1	70	25,550	10,950	1.98E-05	3.68E-05	4.62E-05	8.58E-05
MANGANESE	0.6852	0.7600	0.054	350	30	1	70	25,550	10,950	2.17E-04	2.41E-04	5.07E-04	5.62E-04
MERCURY	0.2628	0.3488	0.054	350	30	1	70	25,550	10,950	8.33E-05	1.11E-04	1.94E-04	2.58E-04
NICKEL	0.1072	0.1729	0.054	350	30	1	70	25,550	10,950	3.40E-05	5.48E-05	7.93E-05	1.28E-04
SILVER	0.1693	0.1729	0.054	350	30	1	70	25,550	10,950	5.37E-05	5.48E-05	1.25E-04	1.28E-04
ZINC	16.5755	18.3120	0.054	350	30	1	70	25,550	10,950	5.25E-03	5.81E-03	1.23E-02	1.35E-02
PESTICIDES													
ALDRIN	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.65E-08	4.88E-08	8.51E-08	1.14E-07
ALPHA-CHLORDANE	0.00016	0.00023	0.054	350	30	1	70	25,550	10,950	5.15E-08	7.28E-08	1.20E-07	1.70E-07
HEPTACHLOR	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	4.00E-08	4.88E-08	9.32E-08	1.14E-07
HEPTACHLOR EPOXIDE	0.00012	0.00016	0.054	350	30	1	70	25,550	10,950	3.87E-08	5.16E-08	9.04E-08	1.20E-07
HEXACHLOROBENZENE	0.00048	0.00059	0.054	350	30	1	70	25,550	10,950	1.52E-07	1.88E-07	3.54E-07	4.39E-07
LINDANE (GAMMA-BHC)	0.00022	0.00045	0.054	350	30	1	70	25,550	10,950	7.13E-08	1.44E-07	1.66E-07	3.35E-07
MIREX	0.00013	0.00015	0.054	350	30	1	70	25,550	10,950	4.00E-08	4.88E-08	9.32E-08	1.14E-07
TRANS-NONACHLOR	0.00018	0.00026	0.054	350	30	1	70	25,550	10,950	5.57E-08	8.10E-08	1.30E-07	1.89E-07
o,p'-DDD	0.000148	0.000154	0.054	350	30	1	70	25,550	10,950	4.69E-08	4.88E-08	1.09E-07	1.14E-07
o,p'-DDE	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.77E-08	4.88E-08	8.79E-08	1.14E-07
o,p'-DDT	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.77E-08	4.88E-08	8.79E-08	1.14E-07
p,p'-DDD	0.00023	0.00034	0.054	350	30	1	70	25,550	10,950	7.32E-08	1.07E-07	1.71E-07	2.50E-07
p,p'-DDE	0.00066	0.00084	0.054	350	30	1	70	25,550	10,950	2.09E-07	2.67E-07	4.88E-07	6.24E-07
p,p'-DDT	0.00094	0.00217	0.054	350	30	1	70	25,550	10,950	2.98E-07	6.87E-07	6.96E-07	1.60E-06

TABLE 3-5
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

						FRACTION INGESTED FROM CONTAM- INATED		AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
	AVERAGE CONC.	MAXIMUM CONC.	INTAKE RATE	EXPOSURE FREQUENCY	EXPOSURE DURATION		BODY WEIGHT			CARCINOGENS		NONCARCINOGENS	
ANALYTE	(mg/kg)	(mg/kg)	(kg/day)	(days/yr)	(years)	SOURCE	(kg)	CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.00695	0.01554	0.054	350	30	1	70	25,550	10,950	2.20E-06	4.93E-06	5.14E-06	1.15E-05
BENZO(A)ANTHRACENE	0.01981	0.03696	0.054	350	30	1	70	25,550	10,950	6.28E-06	1.17E-05	1.47E-05	2.73E-05
BENZO(A)PYRENE	0.02335	0.04200	0.054	350	30	1	70	25,550	10,950	7.40E-06	1.33E-05	1.73E-05	3.11E-05
BENZO(E)PYRENE	0.03627	0.05880	0.054	350	30	1	70	25,550	10,950	1.15E-05	1.86E-05	2.68E-05	4.35E-05
BENZO(G,H,I)PERYLENE	0.00846	0.01344	0.054	350	30	1	70	25,550	10,950	2.68E-06	4.26E-06	6.26E-06	9.94E-06
CHRYSENE	0.03487	0.05460	0.054	350	30	1	70	25,550	10,950	1.11E-05	1.73E-05	2.58E-05	4.04E-05
FLUORANTHENE	0.11429	0.20160	0.054	350	30	1	70	25,550	10,950	3.62E-05	6.39E-05	8.45E-05	1.49E-04
FLUORENE	0.01041	0.02016	0.054	350	30	1	70	25,550	10,950	3.30E-06	6.39E-06	7.70E-06	1.49E-05
INDENO(1,2,3-CD)PYRENE	0.00780	0.01302	0.054	350	30	1	70	25,550	10,950	2.47E-06	4.13E-06	5.77E-06	9.63E-06
PERYLENE	0.01363	0.02100	0.054	350	30	1	70	25,550	10,950	4.32E-06	6.66E-06	1.01E-05	1.55E-05
PHENANTHRENE	0.03220	0.05460	0.054	350	30	1	70	25,550	10,950	1.02E-05	1.73E-05	2.38E-05	4.04E-05
PYRENE	0.10436	0.20580	0.054	350	30	1	70	25,550	10,950	3.31E-05	6.52E-05	7.72E-05	1.52E-04
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01390	0.01820	0.054	350	30	1	70	25,550	10,950	4.41E-06	5.77E-06	1.03E-05	1.35E-05

TABLE 3-6
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
PESTICIDES													
ALDRIN	0.00008	0.00008 *	0.054	350	30	1	70	25,550	10,950	2.63E-08	2.63E-08	6.14E-08	6.14E-08
ALPHA-CHLORDANE	0.00026	0.00026 *	0.054	350	30	1	70	25,550	10,950	8.08E-08	8.08E-08	1.89E-07	1.89E-07
HEPTACHLOR	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.63E-08	4.63E-08	1.08E-07	1.08E-07
HEPTACHLOR EPOXIDE	0.00024	0.00024 *	0.054	350	30	1	70	25,550	10,950	7.55E-08	7.55E-08	1.76E-07	1.76E-07
HEXACHLOROBENZENE	0.00014	0.00014 *	0.054	350	30	1	70	25,550	10,950	4.50E-08	4.50E-08	1.05E-07	1.05E-07
LINDANE (GAMMA-BHC)	0.00008	0.00008 *	0.054	350	30	1	70	25,550	10,950	2.38E-08	2.38E-08	5.55E-08	5.55E-08
MIREX	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.63E-08	4.63E-08	1.08E-07	1.08E-07
TRANS-NONACHLOR	0.00013	0.00013 *	0.054	350	30	1	70	25,550	10,950	4.15E-08	4.15E-08	9.69E-08	9.69E-08
o,p'-DDD	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.63E-08	4.63E-08	1.08E-07	1.08E-07
o,p'-DDE	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.63E-08	4.63E-08	1.08E-07	1.08E-07
o,p'-DDT	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.63E-08	4.63E-08	1.08E-07	1.08E-07
p,p'-DDD	0.00039	0.00039 *	0.054	350	30	1	70	25,550	10,950	1.25E-07	1.25E-07	2.91E-07	2.91E-07
p,p'-DDE	0.00081	0.00081 *	0.054	350	30	1	70	25,550	10,950	2.57E-07	2.57E-07	5.99E-07	5.99E-07
p,p'-DDT	0.00019	0.00019 *	0.054	350	30	1	70	25,550	10,950	6.02E-08	6.02E-08	1.41E-07	1.41E-07
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01290	0.01290 *	0.054	350	30	1	70	25,550	10,950	4.09E-06	4.09E-06	9.54E-06	9.54E-06

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-7

Consumption of Locally Caught Lobster Tail Flesh For Subsistence Fishing
Residential Exposures, Off-Site, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value
IR	=	0.132 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year subsistence (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a)
		365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-7
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAXI-MUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	6.7292	18.2970	0.132	350	30	1	70	25,550	10,950	5.21E-03	1.42E-02	1.22E-02	3.31E-02
ARSENIC	2.7000	5.2600	0.132	350	30	1	70	25,550	10,950	2.09E-03	4.08E-03	4.88E-03	9.51E-03
CADMIUM	0.0059	0.0109	0.132	350	30	1	70	25,550	10,950	4.58E-06	8.45E-06	1.07E-05	1.97E-05
CHROMIUM	0.1717	0.2470	0.132	350	30	1	70	25,550	10,950	1.33E-04	1.91E-04	3.11E-04	4.47E-04
COPPER	5.3747	5.8504	0.132	350	30	1	70	25,550	10,950	4.17E-03	4.53E-03	9.72E-03	1.06E-02
IRON	16.0517	54.9100	0.132	350	30	1	70	25,550	10,950	1.24E-02	4.26E-02	2.90E-02	9.93E-02
LEAD	0.0402	0.1160	0.132	350	30	1	70	25,550	10,950	3.11E-05	8.99E-05	7.26E-05	2.10E-04
MANGANESE	0.6863	1.0633	0.132	350	30	1	70	25,550	10,950	5.32E-04	8.24E-04	1.24E-03	1.92E-03
MERCURY	0.2716	0.3488	0.132	350	30	1	70	25,550	10,950	2.10E-04	2.70E-04	4.91E-04	6.31E-04
NICKEL	0.1181	0.2563	0.132	350	30	1	70	25,550	10,950	9.15E-05	1.99E-04	2.14E-04	4.63E-04
SILVER	0.1442	0.2260	0.132	350	30	1	70	25,550	10,950	1.12E-04	1.75E-04	2.61E-04	4.09E-04
ZINC	17.0493	20.0100	0.132	350	30	1	70	25,550	10,950	1.32E-02	1.55E-02	3.08E-02	3.62E-02
PESTICIDES													
ALDRIN	0.00017	0.00047	0.132	350	30	1	70	25,550	10,950	1.32E-07	3.64E-07	3.07E-07	8.50E-07
ALPHA-CHLORDANE	0.00014	0.00023	0.132	350	30	1	70	25,550	10,950	1.09E-07	1.78E-07	2.55E-07	4.15E-07
HEPTACHLOR	0.00012	0.00015	0.132	350	30	1	70	25,550	10,950	9.30E-08	1.19E-07	2.17E-07	2.78E-07
HEPTACHLOR EPOXIDE	0.00017	0.00048	0.132	350	30	1	70	25,550	10,950	1.35E-07	3.72E-07	3.14E-07	8.68E-07
HEXACHLOROBENZENE	0.00042	0.00059	0.132	350	30	1	70	25,550	10,950	3.25E-07	4.60E-07	7.59E-07	1.07E-06
LINDANE (GAMMA-BHC)	0.00016	0.00045	0.132	350	30	1	70	25,550	10,950	1.22E-07	3.51E-07	2.85E-07	8.20E-07
MIREX	0.00013	0.00015	0.132	350	30	1	70	25,550	10,950	9.74E-08	1.19E-07	2.27E-07	2.78E-07
TRANS-NONACHLOR	0.00016	0.00026	0.132	350	30	1	70	25,550	10,950	1.24E-07	1.98E-07	2.89E-07	4.62E-07
o,p'-DDD	0.00017	0.00035	0.132	350	30	1	70	25,550	10,950	1.33E-07	2.69E-07	3.09E-07	6.27E-07
o,p'-DDE	0.00013	0.00015	0.132	350	30	1	70	25,550	10,950	1.01E-07	1.19E-07	2.35E-07	2.78E-07
o,p'-DDT	0.00013	0.00015	0.132	350	30	1	70	25,550	10,950	1.01E-07	1.19E-07	2.35E-07	2.78E-07
p,p'-DDD	0.00019	0.00034	0.132	350	30	1	70	25,550	10,950	1.47E-07	2.62E-07	3.44E-07	6.12E-07
p,p'-DDE	0.00074	0.00134	0.132	350	30	1	70	25,550	10,950	5.73E-07	1.04E-06	1.34E-06	2.43E-06
p,p'-DDT	0.00050	0.00217	0.132	350	30	1	70	25,550	10,950	3.87E-07	1.68E-06	9.04E-07	3.92E-06

TABLE 3-7
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.01543	0.08215	0.132	350	30	1	70	25,550	10,950	1.20E-05	6.37E-05	2.79E-05	1.49E-04
BENZ(A)ANTHRACENE	0.03637	0.15635	0.132	350	30	1	70	25,550	10,950	2.82E-05	1.21E-04	6.58E-05	2.83E-04
BENZO(A)PYRENE	0.03893	0.15900	0.132	350	30	1	70	25,550	10,950	3.02E-05	1.23E-04	7.04E-05	2.88E-04
BENZO(E)PYRENE	0.04860	0.18020	0.132	350	30	1	70	25,550	10,950	3.77E-05	1.40E-04	8.79E-05	3.26E-04
BENZO(G,H,I)PERYLENE	0.01071	0.03419	0.132	350	30	1	70	25,550	10,950	8.30E-06	2.65E-05	1.94E-05	6.18E-05
CHRYSENE	0.06258	0.27825	0.132	350	30	1	70	25,550	10,950	4.85E-05	2.16E-04	1.13E-04	5.03E-04
FLUORANTHENE	0.19187	0.84800	0.132	350	30	1	70	25,550	10,950	1.49E-04	6.57E-04	3.47E-04	1.53E-03
FLUORENE	0.01467	0.06890	0.132	350	30	1	70	25,550	10,950	1.14E-05	5.34E-05	2.65E-05	1.25E-04
INDOENO(1,2,3-CD)PYRENE	0.01047	0.03472	0.132	350	30	1	70	25,550	10,950	8.12E-06	2.69E-05	1.89E-05	6.28E-05
PERYLENE	0.01706	0.05565	0.132	350	30	1	70	25,550	10,950	1.32E-05	4.31E-05	3.09E-05	1.01E-04
PHENANTHRENE	0.06516	0.33390	0.132	350	30	1	70	25,550	10,950	5.05E-05	2.59E-04	1.18E-04	6.04E-04
PYRENE	0.16044	0.68900	0.132	350	30	1	70	25,550	10,950	1.24E-04	5.34E-04	2.90E-04	1.25E-03
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01341	0.02420	0.132	350	30	1	70	25,550	10,950	1.04E-05	1.88E-05	2.42E-05	4.38E-05

TABLE 3-8
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	7.7685	12.0652	0.381	365	30	1	70	25,550	10,950	1.81E-02	2.81E-02	4.23E-02	6.57E-02
ARSENIC	1.3000	1.8200	0.381	365	30	1	70	25,550	10,950	3.03E-03	4.25E-03	7.08E-03	9.91E-03
CADMIUM	0.0066	0.0109	0.381	365	30	1	70	25,550	10,950	1.55E-05	2.54E-05	3.61E-05	5.93E-05
CHROMIUM	0.1866	0.1887	0.381	365	30	1	70	25,550	10,950	4.35E-04	4.40E-04	1.02E-03	1.03E-03
COPPER	5.4088	5.8483	0.381	365	30	1	70	25,550	10,950	1.26E-02	1.36E-02	2.94E-02	3.18E-02
IRON	15.2400	21.1400	0.381	365	30	1	70	25,550	10,950	3.55E-02	4.93E-02	8.29E-02	1.15E-01
LEAD	0.0415	0.0440	0.381	365	30	1	70	25,550	10,950	9.68E-05	1.03E-04	2.26E-04	2.39E-04
MANGANESE	0.8346	1.0633	0.381	365	30	1	70	25,550	10,950	1.95E-03	2.48E-03	4.54E-03	5.79E-03
MERCURY	0.2322	0.2322 *	0.381	365	30	1	70	25,550	10,950	5.42E-04	5.42E-04	1.26E-03	1.26E-03
NICKEL	0.2052	0.2563	0.381	365	30	1	70	25,550	10,950	4.79E-04	5.98E-04	1.12E-03	1.40E-03
SILVER	0.1586	0.2260	0.381	365	30	1	70	25,550	10,950	3.70E-04	5.27E-04	8.63E-04	1.23E-03
ZINC	15.0195	15.8910	0.381	365	30	1	70	25,550	10,950	3.50E-02	3.71E-02	8.17E-02	8.65E-02
PESTICIDES													
ALDRIN	0.00028	0.00047	0.381	365	30	1	70	25,550	10,950	6.58E-07	1.10E-06	1.53E-06	2.56E-06
ALPHA-CHLORDANE	0.00010	0.00015	0.381	365	30	1	70	25,550	10,950	2.24E-07	3.38E-07	5.23E-07	7.89E-07
HEPTACHLOR	0.00008	0.00015	0.381	365	30	1	70	25,550	10,950	1.75E-07	3.41E-07	4.08E-07	7.95E-07
HEPTACHLOR EPOXIDE	0.00011	0.00020	0.381	365	30	1	70	25,550	10,950	2.59E-07	4.71E-07	6.04E-07	1.10E-06
HEXACHLOROBENZENE	0.00016	0.00019	0.381	365	30	1	70	25,550	10,950	3.64E-07	4.50E-07	8.49E-07	1.05E-06
LINDANE (GAMMA-BHC)	0.00008	0.00009	0.381	365	30	1	70	25,550	10,950	1.94E-07	2.19E-07	4.52E-07	5.12E-07
MIREX	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.85E-07	3.41E-07	6.64E-07	7.95E-07
TRANS-NONACHLOR	0.00016	0.00018	0.381	365	30	1	70	25,550	10,950	3.69E-07	4.18E-07	8.60E-07	9.74E-07
o,p'-DDD	0.00013	0.00015	0.381	365	30	1	70	25,550	10,950	3.01E-07	3.41E-07	7.02E-07	7.95E-07
o,p'-DDE	0.00013	0.00015	0.381	365	30	1	70	25,550	10,950	3.01E-07	3.41E-07	7.02E-07	7.95E-07
o,p'-DDT	0.00013	0.00015	0.381	365	30	1	70	25,550	10,950	3.01E-07	3.41E-07	7.02E-07	7.95E-07
p,p'-DDD	0.00016	0.00018	0.381	365	30	1	70	25,550	10,950	3.78E-07	4.18E-07	8.82E-07	9.74E-07
p,p'-DDE	0.00042	0.00056	0.381	365	30	1	70	25,550	10,950	9.75E-07	1.30E-06	2.28E-06	3.03E-06
p,p'-DDT	0.00019	0.00024	0.381	365	30	1	70	25,550	10,950	4.48E-07	5.55E-07	1.05E-06	1.30E-06

NOTES:

*: AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-8
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.04213	0.08215	0.381	365	30	1	70	25,550	10,950	9.83E-05	1.92E-04	2.29E-04	4.47E-04
BENZO(A)ANTHRACENE	0.09604	0.15635	0.381	365	30	1	70	25,550	10,950	2.24E-04	3.65E-04	5.23E-04	8.51E-04
BENZO(A)PYRENE	0.09830	0.15900	0.381	365	30	1	70	25,550	10,950	2.29E-04	3.71E-04	5.35E-04	8.65E-04
BENZO(E)PYRENE	0.11360	0.18020	0.381	365	30	1	70	25,550	10,950	2.65E-04	4.20E-04	6.18E-04	9.81E-04
BENZO(G,H,I)PERYLENE	0.02273	0.03419	0.381	365	30	1	70	25,550	10,950	5.30E-05	7.97E-05	1.24E-04	1.86E-04
CHRYSENE	0.16498	0.27825	0.381	365	30	1	70	25,550	10,950	3.85E-04	6.49E-04	8.98E-04	1.51E-03
FLUORANTHENE	0.49450	0.84800	0.381	365	30	1	70	25,550	10,950	1.15E-03	1.98E-03	2.69E-03	4.62E-03
FLUORENE	0.03504	0.06890	0.381	365	30	1	70	25,550	10,950	8.17E-05	1.61E-04	1.91E-04	3.75E-04
INDENO(1,2,3-CD)PYRENE	0.02347	0.03472	0.381	365	30	1	70	25,550	10,950	5.47E-05	8.10E-05	1.28E-04	1.89E-04
PERYLENE	0.03793	0.05565	0.381	365	30	1	70	25,550	10,950	8.85E-05	1.30E-04	2.06E-04	3.03E-04
PHENANTHRENE	0.17776	0.33390	0.381	365	30	1	70	25,550	10,950	4.15E-04	7.79E-04	9.68E-04	1.82E-03
PYRENE	0.40090	0.68900	0.381	365	30	1	70	25,550	10,950	9.35E-04	1.61E-03	2.18E-03	3.75E-03
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.00860	0.00890	0.054	350	30	1	70	25,550	10,950	2.73E-06	2.82E-06	6.36E-06	6.58E-06

NOTES:

*: AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-9
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	2.2133	2.5338	0.381	365	30	1	70	25,550	10,950	5.16E-03	5.91E-03	1.20E-02	1.38E-02
ARSENIC	3.9050	5.2600	0.381	365	30	1	70	25,550	10,950	9.11E-03	1.23E-02	2.13E-02	2.86E-02
CADMIUM	0.0062	0.0062	0.381	365	30	1	70	25,550	10,950	1.45E-05	1.45E-05	3.37E-05	3.37E-05
CHROMIUM	0.1397	0.1442	0.381	365	30	1	70	25,550	10,950	3.26E-04	3.36E-04	7.60E-04	7.85E-04
COPPER	5.7748	5.8504	0.381	365	30	1	70	25,550	10,950	1.35E-02	1.36E-02	3.14E-02	3.18E-02
IRON	3.4750	4.7200	0.381	365	30	1	70	25,550	10,950	8.11E-03	1.10E-02	1.89E-02	2.57E-02
LEAD	0.0165	0.0210	0.381	365	30	1	70	25,550	10,950	3.85E-05	4.90E-05	8.98E-05	1.14E-04
MANGANESE	0.5392	0.7488	0.381	365	30	1	70	25,550	10,950	1.26E-03	1.75E-03	2.93E-03	4.08E-03
MERCURY	0.3001	0.3090	0.381	365	30	1	70	25,550	10,950	7.00E-04	7.21E-04	1.63E-03	1.68E-03
NICKEL	0.0421	0.0666	0.381	365	30	1	70	25,550	10,950	9.81E-05	1.55E-04	2.29E-04	3.62E-04
SILVER	0.1047	0.1414	0.381	365	30	1	70	25,550	10,950	2.44E-04	3.30E-04	5.70E-04	7.70E-04
ZINC	19.5530	20.0100	0.381	365	30	1	70	25,550	10,950	4.56E-02	4.67E-02	1.06E-01	1.09E-01
PESTICIDES													
ALDRIN	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
ALPHA-CHLORDANE	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
HEPTACHLOR	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
HEPTACHLOR EPOXIDE	0.00032	0.00048	0.381	365	30	1	70	25,550	10,950	7.35E-07	1.13E-06	1.71E-06	2.63E-06
HEXACHLOROBENZENE	0.00059	0.00059 *	0.381	365	30	1	70	25,550	10,950	1.37E-06	1.37E-06	3.20E-06	3.20E-06
LINDANE (GAMMA-BHC)	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
MIREX	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
TRANS-NONACHLOR	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
o,p'-DDD	0.00025	0.00035	0.381	365	30	1	70	25,550	10,950	5.76E-07	8.08E-07	1.34E-06	1.89E-06
o,p'-DDE	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
o,p'-DDT	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
p,p'-DDD	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07
p,p'-DDE	0.00118	0.00134	0.381	365	30	1	70	25,550	10,950	2.74E-06	3.14E-06	6.40E-06	7.32E-06
p,p'-DDT	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.43E-07	3.43E-07	8.00E-07	8.00E-07

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-9
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
BENZO(A)PYRENE	0.00294	0.00399	0.381	365	30	1	70	25,550	10,950	6.86E-06	9.31E-06	1.60E-05	2.17E-05
FLUORANTHENE	0.00562	0.00935	0.381	365	30	1	70	25,550	10,950	1.31E-05	2.18E-05	3.06E-05	5.09E-05
PHENANTHRENE	0.00200	0.00273	0.381	365	30	1	70	25,550	10,950	4.65E-06	6.37E-06	1.09E-05	1.49E-05
PYRENE	0.00410	0.00630	0.381	365	30	1	70	25,550	10,950	9.55E-06	1.47E-05	2.23E-05	3.43E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01756	0.02417	0.381	365	30	1	70	25,550	10,950	4.10E-05	5.64E-05	9.56E-05	1.32E-04

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-10
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	10.2058	18.2970	0.381	365	30	1	70	25,550	10,950	2.38E-02	4.27E-02	5.55E-02	9.96E-02
ARSENIC	2.8950	2.9200	0.381	365	30	1	70	25,550	10,950	6.75E-03	6.81E-03	1.58E-02	1.59E-02
CADMIUM	0.0049	0.0076	0.381	365	30	1	70	25,550	10,950	1.14E-05	1.77E-05	2.67E-05	4.14E-05
CHROMIUM	0.1889	0.2470	0.381	365	30	1	70	25,550	10,950	4.41E-04	5.76E-04	1.03E-03	1.34E-03
COPPER	4.9405	5.7770	0.381	365	30	1	70	25,550	10,950	1.15E-02	1.35E-02	2.69E-02	3.14E-02
IRON	29.4400	54.9100	0.381	365	30	1	70	25,550	10,950	6.87E-02	1.28E-01	1.60E-01	2.99E-01
LEAD	0.0625	0.1160	0.381	365	30	1	70	25,550	10,950	1.46E-04	2.71E-04	3.40E-04	6.31E-04
MANGANESE	0.6852	0.7600	0.381	365	30	1	70	25,550	10,950	1.60E-03	1.77E-03	3.73E-03	4.14E-03
MERCURY	0.2628	0.3488	0.381	365	30	1	70	25,550	10,950	6.13E-04	8.14E-04	1.43E-03	1.90E-03
NICKEL	0.1072	0.1729	0.381	365	30	1	70	25,550	10,950	2.50E-04	4.03E-04	5.83E-04	9.41E-04
SILVER	0.1693	0.1729	0.381	365	30	1	70	25,550	10,950	3.95E-04	4.03E-04	9.21E-04	9.41E-04
ZINC	16.5755	18.3120	0.381	365	30	1	70	25,550	10,950	3.87E-02	4.27E-02	9.02E-02	9.97E-02
PESTICIDES													
ALDRIN	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.68E-07	3.59E-07	6.26E-07	8.38E-07
ALPHA-CHLORDANE	0.00016	0.00023	0.381	365	30	1	70	25,550	10,950	3.79E-07	5.35E-07	8.84E-07	1.25E-06
HEPTACHLOR	0.00013	0.00015	0.381	365	30	1	70	25,550	10,950	2.94E-07	3.59E-07	6.86E-07	8.38E-07
HEPTACHLOR EPOXIDE	0.00012	0.00016	0.381	365	30	1	70	25,550	10,950	2.85E-07	3.80E-07	6.65E-07	8.86E-07
HEXACHLOROBENZENE	0.00048	0.00059	0.381	365	30	1	70	25,550	10,950	1.12E-06	1.39E-06	2.60E-06	3.23E-06
LINDANE (GAMMA-BHC)	0.00022	0.00045	0.381	365	30	1	70	25,550	10,950	5.25E-07	1.06E-06	1.22E-06	2.47E-06
MIREX	0.00013	0.00015	0.381	365	30	1	70	25,550	10,950	2.94E-07	3.59E-07	6.86E-07	8.38E-07
TRANS-NONACHLOR	0.00018	0.00026	0.381	365	30	1	70	25,550	10,950	4.10E-07	5.96E-07	9.57E-07	1.39E-06
o,p'-DDD	0.00015	0.00015	0.381	365	30	1	70	25,550	10,950	3.45E-07	3.59E-07	8.04E-07	8.38E-07
o,p'-DDE	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.77E-07	3.59E-07	6.47E-07	8.38E-07
o,p'-DDT	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.77E-07	3.59E-07	6.47E-07	8.38E-07
p,p'-DDD	0.00023	0.00034	0.381	365	30	1	70	25,550	10,950	5.38E-07	7.89E-07	1.26E-06	1.84E-06
p,p'-DDE	0.00066	0.00084	0.381	365	30	1	70	25,550	10,950	1.54E-06	1.97E-06	3.59E-06	4.59E-06
p,p'-DDT	0.00094	0.00217	0.381	365	30	1	70	25,550	10,950	2.19E-06	5.06E-06	5.12E-06	1.18E-05

TABLE 3-10
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS MAX	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) NONCARCINOGENS AVG	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) NONCARCINOGENS MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.00695	0.01554	0.381	365	30	1	70	25,550	10,950	1.62E-05	3.62E-05	3.78E-05	8.46E-05
BENZ(A)ANTHRACENE	0.01981	0.03696	0.381	365	30	1	70	25,550	10,950	4.62E-05	8.62E-05	1.08E-04	2.01E-04
BENZO(A)PYRENE	0.02335	0.04200	0.381	365	30	1	70	25,550	10,950	5.45E-05	9.80E-05	1.27E-04	2.29E-04
BENZO(E)PYRENE	0.03627	0.05880	0.381	365	30	1	70	25,550	10,950	8.46E-05	1.37E-04	1.97E-04	3.20E-04
BENZO(G,H,I)PERYLENE	0.00846	0.01344	0.381	365	30	1	70	25,550	10,950	1.97E-05	3.14E-05	4.60E-05	7.32E-05
CHRYSENE	0.03487	0.05460	0.381	365	30	1	70	25,550	10,950	8.13E-05	1.27E-04	1.90E-04	2.97E-04
FLUORANTHENE	0.11429	0.20160	0.381	365	30	1	70	25,550	10,950	2.67E-04	4.70E-04	6.22E-04	1.10E-03
FLUORENE	0.01041	0.02016	0.381	365	30	1	70	25,550	10,950	2.43E-05	4.70E-05	5.67E-05	1.10E-04
INDENO(1,2,3-CD)PYRENE	0.00780	0.01302	0.381	365	30	1	70	25,550	10,950	1.82E-05	3.04E-05	4.24E-05	7.09E-05
PERYLENE	0.01363	0.02100	0.381	365	30	1	70	25,550	10,950	3.18E-05	4.90E-05	7.42E-05	1.14E-04
PHENANTHRENE	0.03220	0.05460	0.381	365	30	1	70	25,550	10,950	7.51E-05	1.27E-04	1.75E-04	2.97E-04
PYRENE	0.10436	0.20580	0.381	365	30	1	70	25,550	10,950	2.43E-04	4.80E-04	5.68E-04	1.12E-03
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01390	0.01820	0.381	365	30	1	70	25,550	10,950	3.24E-05	4.25E-05	7.57E-05	9.91E-05

TABLE 3-11
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
PESTICIDES													
ALDRIN	0.00008	0.00008 *	0.381	365	30	1	70	25,550	10,950	1.94E-07	1.94E-07	4.52E-07	4.52E-07
ALPHA-CHLORDANE	0.00026	0.00026 *	0.381	365	30	1	70	25,550	10,950	5.95E-07	5.95E-07	1.39E-06	1.39E-06
HEPTACHLOR	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.41E-07	3.41E-07	7.95E-07	7.95E-07
HEPTACHLOR EPOXIDE	0.00024	0.00024 *	0.381	365	30	1	70	25,550	10,950	5.55E-07	5.55E-07	1.30E-06	1.30E-06
HEXACHLOROBENZENE	0.00014	0.00014 *	0.381	365	30	1	70	25,550	10,950	3.31E-07	3.31E-07	7.73E-07	7.73E-07
LINDANE (GAMMA-BHC)	0.00008	0.00008 *	0.381	365	30	1	70	25,550	10,950	1.75E-07	1.75E-07	4.08E-07	4.08E-07
MIREX	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.41E-07	3.41E-07	7.95E-07	7.95E-07
TRANS-NONACHLOR	0.00013	0.00013 *	0.381	365	30	1	70	25,550	10,950	3.06E-07	3.06E-07	7.13E-07	7.13E-07
o,p'-DDD	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.41E-07	3.41E-07	7.95E-07	7.95E-07
o,p'-DDE	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.41E-07	3.41E-07	7.95E-07	7.95E-07
o,p'-DDT	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.41E-07	3.41E-07	7.95E-07	7.95E-07
p,p'-DDD	0.00039	0.00039 *	0.381	365	30	1	70	25,550	10,950	9.19E-07	9.19E-07	2.14E-06	2.14E-06
p,p'-DDE	0.00081	0.00081 *	0.381	365	30	1	70	25,550	10,950	1.89E-06	1.89E-06	4.41E-06	4.41E-06
p,p'-DDT	0.00019	0.00019 *	0.381	365	30	1	70	25,550	10,950	4.43E-07	4.43E-07	1.03E-06	1.03E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01290	0.01290 *	0.381	365	30	1	70	25,550	10,950	3.01E-05	3.01E-05	7.02E-05	7.02E-05

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-12

Consumption of Locally Caught Whole Lobster (Tail Flesh and Hepatopancreas Weighted Average)
Recreational Exposures, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value
IR	=	.054 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-12
CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	6.7567	17.8130	0.054	350	30	1	70	25,550	10,950	2.14E-03	5.65E-03	5.00E-03	1.32E-02
ARSENIC	3.0626	6.0663	0.054	350	30	1	70	25,550	10,950	9.71E-04	1.92E-03	2.27E-03	4.49E-03
CADMIUM	0.4508	0.9511	0.054	350	30	1	70	25,550	10,950	1.43E-04	3.02E-04	3.33E-04	7.04E-04
CHROMIUM	0.1792	0.2639	0.054	350	30	1	70	25,550	10,950	5.68E-05	8.37E-05	1.33E-04	1.95E-04
COPPER	12.2007	20.2817	0.054	350	30	1	70	25,550	10,950	3.87E-03	6.43E-03	9.03E-03	1.50E-02
IRON	17.8709	54.5033	0.054	350	30	1	70	25,550	10,950	5.67E-03	1.73E-02	1.32E-02	4.03E-02
LEAD	0.0446	0.1228	0.054	350	30	1	70	25,550	10,950	1.41E-05	3.89E-05	3.30E-05	9.08E-05
MANGANESE	0.8946	1.2996	0.054	350	30	1	70	25,550	10,950	2.84E-04	4.12E-04	6.62E-04	9.61E-04
MERCURY	0.2531	0.3277	0.054	350	30	1	70	25,550	10,950	8.02E-05	1.04E-04	1.87E-04	2.42E-04
NICKEL	0.1533	0.3349	0.054	350	30	1	70	25,550	10,950	4.86E-05	1.06E-04	1.13E-04	2.48E-04
SILVER	0.1874	0.3285	0.054	350	30	1	70	25,550	10,950	5.94E-05	1.04E-04	1.39E-04	2.43E-04
ZINC	18.2385	24.2099	0.054	350	30	1	70	25,550	10,950	5.78E-03	7.68E-03	1.35E-02	1.79E-02
PESTICIDES													
ALDRIN	0.00025	0.00074	0.054	350	30	1	70	25,550	10,950	8.07E-08	2.33E-07	1.88E-07	5.45E-07
ALPHA-CHLORDANE	0.00054	0.00126	0.054	350	30	1	70	25,550	10,950	1.70E-07	3.98E-07	3.96E-07	9.29E-07
HEPTACHLOR	0.00017	0.00024	0.054	350	30	1	70	25,550	10,950	5.31E-08	7.65E-08	1.24E-07	1.79E-07
HEPTACHLOR EPOXIDE	0.00023	0.00065	0.054	350	30	1	70	25,650	10,950	7.24E-08	2.05E-07	1.69E-07	4.77E-07
HEXACHLOROBENZENE	0.00172	0.00434	0.054	350	30	1	70	25,550	10,950	5.46E-07	1.37E-06	1.27E-06	3.21E-06
LINDANE (GAMMA-BHC)	0.00046	0.00219	0.054	350	30	1	70	25,550	10,950	1.47E-07	6.94E-07	3.42E-07	1.62E-06
MIREX	0.00018	0.00025	0.054	350	30	1	70	25,550	10,950	5.82E-08	7.82E-08	1.36E-07	1.83E-07
TRANS-NONACHLOR	0.00217	0.00395	0.054	350	30	1	70	25,550	10,950	6.89E-07	1.25E-06	1.61E-06	2.92E-06
o,p'-DDD	0.00021	0.00037	0.054	350	30	1	70	25,550	10,950	6.58E-08	1.17E-07	1.54E-07	2.73E-07
o,p'-DDE	0.00041	0.00082	0.054	350	30	1	70	25,550	10,950	1.30E-07	2.59E-07	3.04E-07	6.05E-07
o,p'-DDT	0.00034	0.00075	0.054	350	30	1	70	25,550	10,950	1.08E-07	2.38E-07	2.53E-07	5.55E-07
p,p'-DDD	0.00222	0.00381	0.054	350	30	1	70	25,550	10,950	7.03E-07	1.21E-06	1.64E-06	2.82E-06
p,p'-DDE	0.02151	0.03937	0.054	350	30	1	70	25,550	10,950	6.82E-06	1.25E-05	1.59E-05	2.91E-05
p,p'-DDT	0.00099	0.00268	0.054	350	30	1	70	25,550	10,950	3.15E-07	8.50E-07	7.36E-07	1.98E-06

TABLE 3-12
CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.01581	0.07837	0.054	350	30	1	70	25,550	10,950	5.01E-06	2.48E-05	1.17E-05	5.80E-05
BENZO(A)ANTHRACENE	0.04003	0.15901	0.054	350	30	1	70	25,550	10,950	1.27E-05	5.04E-05	2.96E-05	1.18E-04
BENZO(A)PYRENE	0.04459	0.16491	0.054	350	30	1	70	25,550	10,950	1.41E-05	5.23E-05	3.30E-05	1.22E-04
BENZO(E)PYRENE	0.05512	0.18597	0.054	350	30	1	70	25,550	10,950	1.75E-05	5.90E-05	4.08E-05	1.38E-04
BENZO(G,H,I)PERYLENE	0.01537	0.04466	0.054	350	30	1	70	25,550	10,950	4.87E-06	1.42E-05	1.14E-05	3.30E-05
CHRYSENE	0.06712	0.27442	0.054	350	30	1	70	25,550	10,950	2.13E-05	8.70E-05	4.97E-05	2.03E-04
FLUORANTHENE	0.20586	0.83358	0.054	350	30	1	70	25,550	10,950	6.53E-05	2.64E-04	1.52E-04	6.17E-04
FLUORENE	0.01419	0.06377	0.054	350	30	1	70	25,550	10,950	4.50E-06	2.02E-05	1.05E-05	4.72E-05
INDENO(1,2,3-CD)PYRENE	0.01455	0.04384	0.054	350	30	1	70	25,550	10,950	4.61E-06	1.39E-05	1.08E-05	3.24E-05
PERYLENE	0.02426	0.05767	0.054	350	30	1	70	25,550	10,950	7.69E-06	1.83E-05	1.79E-05	4.27E-05
PHENANTHRENE	0.13049	0.31770	0.054	350	30	1	70	25,550	10,950	4.14E-05	1.01E-04	9.65E-05	2.35E-04
PYRENE	0.17237	0.68001	0.054	350	30	1	70	25,550	10,950	5.46E-05	2.16E-04	1.28E-04	5.03E-04
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.12256	0.25847	0.054	350	30	1	70	25,550	10,950	3.89E-05	8.19E-05	9.07E-05	1.91E-04

TABLE 3-13
CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAXI-MUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
PESTICIDES													
ALDRIN	0.00013	0.00013	0.054	350	30	1	70	25,550	10,950	3.99E-08	3.99E-08	9.32E-08	9.32E-08
ALPHA-CHLORDANE	0.00023	0.00028	0.054	350	30	1	70	25,550	10,950	7.36E-08	8.96E-08	1.72E-07	2.09E-07
HEPTACHLOR	0.00013	0.00018	0.054	350	30	1	70	25,550	10,950	4.22E-08	5.79E-08	9.84E-08	1.35E-07
HEPTACHLOR EPOXIDE	0.00022	0.00027	0.054	350	30	1	70	25,550	10,950	6.87E-08	8.47E-08	1.60E-07	1.98E-07
HEXACHLOROBENZENE	0.00013	0.00174	0.054	350	30	1	70	25,550	10,950	4.10E-08	5.52E-07	9.57E-08	1.29E-06
LINDANE (GAMMA-BHC)	0.00007	0.00013	0.054	350	30	1	70	25,550	10,950	2.17E-08	4.21E-08	5.05E-08	9.83E-08
MIREX	0.00013	0.00018	0.054	350	30	1	70	25,550	10,950	4.22E-08	5.81E-08	9.84E-08	1.36E-07
TRANS-NONACHLOR	0.00012	0.00224	0.054	350	30	1	70	25,550	10,950	3.78E-08	7.12E-07	8.83E-08	1.66E-06
o,p'-DDE	0.00013	0.00057	0.054	350	30	1	70	25,550	10,950	4.22E-08	1.79E-07	9.84E-08	4.19E-07
p,p'-DDD	0.00036	0.00067	0.054	350	30	1	70	25,550	10,950	1.14E-07	2.13E-07	2.66E-07	4.98E-07
p,p'-DDE	0.00074	0.02499	0.054	350	30	1	70	25,550	10,950	2.34E-07	7.92E-06	5.46E-07	1.85E-05
p,p'-DDT	0.00017	0.00022	0.054	350	30	1	70	25,550	10,950	6.49E-08	7.08E-08	1.28E-07	1.65E-07
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01175	0.09184	0.054	350	30	1	70	25,550	10,950	3.73E-06	2.91E-05	8.69E-06	6.79E-05

TABLE 3-14

Consumption of Locally Caught Whole Lobster (Tail Flesh and Hepatopancreas Weighted Average)
For Subsistence Fishing
Residential Exposures, Off-Site, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value weighted average value for flesh and hepato pancreas (see Section 3.4.2.2.2)
IR	=	0.132 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year subsistence (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-14
CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	6.7567	17.8130	0.132	350	30	1	70	25,550	10,950	5.24E-03	1.38E-02	1.22E-02	3.22E-02
ARSENIC	3.0626	6.0663	0.132	350	30	1	70	25,550	10,950	2.37E-03	4.70E-03	5.54E-03	1.10E-02
CADMIUM	0.4508	0.9511	0.132	350	30	1	70	25,550	10,950	3.49E-04	7.37E-04	8.15E-04	1.72E-03
CHROMIUM	0.1792	0.2639	0.132	350	30	1	70	25,550	10,950	1.39E-04	2.05E-04	3.24E-04	4.77E-04
COPPER	12.2007	20.2817	0.132	350	30	1	70	25,550	10,950	9.45E-03	1.57E-02	2.21E-02	3.67E-02
IRON	17.8709	54.5033	0.132	350	30	1	70	25,550	10,950	1.38E-02	4.22E-02	3.23E-02	9.86E-02
LEAD	0.0446	0.1228	0.132	350	30	1	70	25,550	10,950	3.46E-05	9.51E-05	8.06E-05	2.22E-04
MANGANESE	0.8946	1.2996	0.132	350	30	1	70	25,550	10,950	6.93E-04	1.01E-03	1.62E-03	2.35E-03
MERCURY	0.2531	0.3277	0.132	350	30	1	70	25,550	10,950	1.96E-04	2.54E-04	4.58E-04	5.93E-04
NICKEL	0.1533	0.3349	0.132	350	30	1	70	25,550	10,950	1.19E-04	2.60E-04	2.77E-04	6.06E-04
SILVER	0.1874	0.3285	0.132	350	30	1	70	25,550	10,950	1.45E-04	2.55E-04	3.39E-04	5.94E-04
ZINC	18.2385	24.2099	0.132	350	30	1	70	25,550	10,950	1.41E-02	1.88E-02	3.30E-02	4.38E-02
PESTICIDES													
ALDRIN	0.00025	0.00074	0.132	350	30	1	70	25,550	10,950	1.97E-07	5.71E-07	4.60E-07	1.33E-06
ALPHA-CHLORDANE	0.00054	0.00126	0.132	350	30	1	70	25,550	10,950	4.15E-07	9.73E-07	9.69E-07	2.27E-06
HEPTACHLOR	0.00017	0.00024	0.132	350	30	1	70	25,550	10,950	1.30E-07	1.87E-07	3.03E-07	4.36E-07
HEPTACHLOR EPOXIDE	0.00023	0.00065	0.132	350	30	1	70	25,550	10,950	1.77E-07	5.00E-07	4.13E-07	1.17E-06
HEXACHLOROBENZENE	0.00172	0.00434	0.132	350	30	1	70	25,550	10,950	1.34E-06	3.36E-06	3.12E-06	7.84E-06
LINDANE (GAMMA-BHC)	0.00046	0.00219	0.132	350	30	1	70	25,550	10,950	3.58E-07	1.70E-06	8.36E-07	3.96E-06
MIREX	0.00018	0.00025	0.132	350	30	1	70	25,550	10,950	1.42E-07	1.91E-07	3.32E-07	4.46E-07
TRANS-NONACHLOR	0.00217	0.00395	0.132	350	30	1	70	25,550	10,950	1.68E-06	3.06E-06	3.93E-06	7.14E-06
o,p'-DDD	0.00021	0.00037	0.132	350	30	1	70	25,550	10,950	1.61E-07	2.86E-07	3.75E-07	6.68E-07
o,p'-DDE	0.00041	0.00082	0.132	350	30	1	70	25,550	10,950	3.18E-07	6.34E-07	7.42E-07	1.48E-06
o,p'-DDT	0.00034	0.00075	0.132	350	30	1	70	25,550	10,950	2.65E-07	5.82E-07	6.18E-07	1.36E-06
p,p'-DDD	0.00222	0.00381	0.132	350	30	1	70	25,550	10,950	1.72E-06	2.96E-06	4.01E-06	6.90E-06
p,p'-DDE	0.02151	0.03937	0.132	350	30	1	70	25,550	10,950	1.67E-05	3.05E-05	3.89E-05	7.12E-05
p,p'-DDT	0.00099	0.00268	0.132	350	30	1	70	25,550	10,950	7.71E-07	2.08E-06	1.80E-06	4.85E-06

TABLE 3-14
CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.01581	0.07837	0.132	350	30	1	70	25,550	10,950	1.23E-05	6.07E-05	2.86E-05	1.42E-04
BENZO(A)ANTHRACENE	0.04003	0.15901	0.132	350	30	1	70	25,550	10,950	3.10E-05	1.23E-04	7.24E-05	2.88E-04
BENZO(A)PYRENE	0.04459	0.16491	0.132	350	30	1	70	25,550	10,950	3.46E-05	1.28E-04	8.06E-05	2.98E-04
BENZO(E)PYRENE	0.05512	0.18597	0.132	350	30	1	70	25,550	10,950	4.27E-05	1.44E-04	9.97E-05	3.36E-04
BENZO(G,H,I)PERYLENE	0.01537	0.04466	0.132	350	30	1	70	25,550	10,950	1.19E-05	3.46E-05	2.78E-05	8.08E-05
CHRYSENE	0.06712	0.27442	0.132	350	30	1	70	25,550	10,950	5.20E-05	2.13E-04	1.21E-04	4.96E-04
FLUORANTHENE	0.20586	0.83358	0.132	350	30	1	70	25,550	10,950	1.60E-04	6.46E-04	3.72E-04	1.51E-03
FLUORENE	0.01419	0.06377	0.132	350	30	1	70	25,550	10,950	1.10E-05	4.94E-05	2.57E-05	1.15E-04
INDENO(1,2,3-CD)PYRENE	0.01455	0.04384	0.132	350	30	1	70	25,550	10,950	1.13E-05	3.40E-05	2.63E-05	7.93E-05
PERYLENE	0.02426	0.05767	0.132	350	30	1	70	25,550	10,950	1.88E-05	4.47E-05	4.39E-05	1.04E-04
PHENANTHRENE	0.13049	0.31770	0.132	350	30	1	70	25,550	10,950	1.01E-04	2.46E-04	2.36E-04	5.74E-04
PYRENE	0.17237	0.68001	0.132	350	30	1	70	25,550	10,950	1.34E-04	5.27E-04	3.12E-04	1.23E-03
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.12256	0.25847	0.132	350	30	1	70	25,550	10,950	9.50E-05	2.00E-04	2.22E-04	4.67E-04

TABLE 3-15
CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
PESTICIDES													
ALDRIN	0.00013	0.00013 *	0.381	365	30	1	70	25,550	10,950	2.94E-07	2.94E-07	6.86E-07	6.86E-07
ALPHA-CHLORDANE	0.00023	0.00028	0.381	365	30	1	70	25,550	10,950	5.42E-07	6.59E-07	1.26E-06	1.54E-06
HEPTACHLOR	0.00013	0.00018	0.381	365	30	1	70	25,550	10,950	3.10E-07	4.26E-07	7.24E-07	9.93E-07
HEPTACHLOR EPOXIDE	0.00022	0.00027	0.381	365	30	1	70	25,550	10,950	5.06E-07	6.23E-07	1.18E-06	1.45E-06
HEXACHLOROBENZENE	0.00013	0.00174	0.381	365	30	1	70	25,550	10,950	3.02E-07	4.06E-06	7.04E-07	9.47E-06
LINDANE (GAMMA-BHC)	0.00007	0.00013	0.381	365	30	1	70	25,550	10,950	1.59E-07	3.10E-07	3.72E-07	7.23E-07
MIREX	0.00013	0.00018	0.381	365	30	1	70	25,550	10,950	3.10E-07	4.28E-07	7.24E-07	9.98E-07
TRANS-NONACHLOR	0.00012	0.00224	0.381	365	30	1	70	25,550	10,950	2.78E-07	5.24E-06	6.50E-07	1.22E-05
o,p'-DDE	0.00013	0.00057	0.381	365	30	1	70	25,550	10,950	3.10E-07	1.32E-06	7.24E-07	3.08E-06
p,p'-DDD	0.00036	0.00067	0.381	365	30	1	70	25,550	10,950	8.37E-07	1.57E-06	1.95E-06	3.66E-06
p,p'-DDE	0.00074	0.02499	0.381	365	30	1	70	25,550	10,950	1.72E-06	5.83E-05	4.02E-06	1.36E-04
p,p'-DDT	0.00017	0.00022	0.381	365	30	1	70	25,550	10,950	4.04E-07	5.21E-07	9.42E-07	1.22E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01175	0.09184	0.381	365	30	1	70	25,550	10,950	2.74E-05	2.14E-04	6.40E-05	5.00E-04

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-16

Consumption of Locally Caught Mussels
Recreational Exposures, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value
IR	=	.054 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a)
		365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-16
CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	29.9680	58.9860	0.054	350	30	1	70	25,550	10,950	9.50E-03	1.87E-02	2.22E-02	4.36E-02
ARSENIC	0.8652	2.2000	0.054	350	30	1	70	25,550	10,950	2.74E-04	6.97E-04	6.40E-04	1.63E-03
CADMIUM	0.2062	0.3432	0.054	350	30	1	70	25,550	10,950	6.54E-05	1.09E-04	1.53E-04	2.54E-04
CHROMIUM	0.4021	0.6040	0.054	350	30	1	70	25,550	10,950	1.27E-04	1.91E-04	2.97E-04	4.47E-04
COPPER	0.8333	3.1654	0.054	350	30	1	70	25,550	10,950	2.64E-04	1.00E-03	6.16E-04	2.34E-03
IRON	65.1706	128.7000	0.054	350	30	1	70	25,550	10,950	2.07E-02	4.08E-02	4.82E-02	9.52E-02
LEAD	1.0316	3.1200	0.054	350	30	1	70	25,550	10,950	3.27E-04	9.89E-04	7.63E-04	2.31E-03
MANGANESE	1.7338	8.1360	0.054	350	30	1	70	25,550	10,950	5.50E-04	2.58E-03	1.28E-03	6.02E-03
MERCURY	0.0465	0.1096	0.054	350	30	1	70	25,550	10,950	1.47E-05	3.47E-05	3.44E-05	8.11E-05
NICKEL	0.2099	0.4681	0.054	350	30	1	70	25,550	10,950	6.65E-05	1.48E-04	1.55E-04	3.46E-04
SILVER	0.0430	0.4077	0.054	350	30	1	70	25,550	10,950	1.36E-05	1.29E-04	3.18E-05	3.02E-04
ZINC	12.5182	25.0860	0.054	350	30	1	70	25,550	10,950	3.97E-03	7.95E-03	9.26E-03	1.86E-02
PESTICIDES													
ALDRIN	0.00028	0.00377	0.054	350	30	1	70	25,550	10,950	8.72E-08	1.20E-06	2.03E-07	2.79E-06
ALPHA-CHLORDANE	0.00040	0.00262	0.054	350	30	1	70	25,550	10,950	1.25E-07	8.30E-07	2.92E-07	1.94E-06
HEPTACHLOR	0.00007	0.00002	0.054	350	30	1	70	25,550	10,950	2.06E-08	6.66E-09	4.81E-08	1.55E-08
HEPTACHLOR EPOXIDE	0.00004	0.00025	0.054	350	30	1	70	25,550	10,950	1.14E-08	8.02E-08	2.66E-08	1.87E-07
HEXACHLOROBENZENE	0.00022	0.00548	0.054	350	30	1	70	25,550	10,950	7.10E-08	1.74E-06	1.66E-07	4.06E-06
LINDANE (GAMMA-BHC)	0.00017	0.00414	0.054	350	30	1	70	25,550	10,950	5.45E-08	1.31E-06	1.27E-07	3.06E-06
MIREX	0.00008	0.00015	0.054	350	30	1	70	25,550	10,950	2.63E-08	4.72E-08	6.14E-08	1.10E-07
TRANS-NONACHLOR	0.00038	0.00265	0.054	350	30	1	70	25,550	10,950	1.21E-07	8.40E-07	2.83E-07	1.96E-06
o,p'-DDD	0.00025	0.00196	0.054	350	30	1	70	25,550	10,950	7.80E-08	6.21E-07	1.82E-07	1.45E-06
o,p'-DDE	0.00009	0.00017	0.054	350	30	1	70	25,550	10,950	2.92E-08	5.45E-08	6.81E-08	1.27E-07
o,p'-DDT	0.00031	0.00347	0.054	350	30	1	70	25,550	10,950	9.95E-08	1.10E-06	2.32E-07	2.57E-06
p,p'-DDD	0.00150	0.00954	0.054	350	30	1	70	25,550	10,950	4.76E-07	3.03E-06	1.11E-06	7.06E-06
p,p'-DDE	0.00147	0.01038	0.054	350	30	1	70	25,550	10,950	4.66E-07	3.29E-06	1.09E-06	7.68E-06
p,p'-DDT	0.00138	0.00963	0.054	350	30	1	70	25,550	10,950	4.38E-07	3.05E-06	1.02E-06	7.12E-06

TABLE 3-16
CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.00115	0.00649	0.054	350	30	1	70	25,550	10,950	3.63E-07	2.06E-06	8.48E-07	4.80E-06
BENZO(A)ANTHRACENE	0.00206	0.00741	0.054	350	30	1	70	25,550	10,950	6.55E-07	2.35E-06	1.53E-06	5.48E-06
BENZO(A)PYRENE	0.00134	0.00456	0.054	350	30	1	70	25,550	10,950	4.25E-07	1.45E-06	9.92E-07	3.37E-06
BENZO(E)PYRENE	0.00470	0.01320	0.054	350	30	1	70	25,550	10,950	1.49E-06	4.18E-06	3.48E-06	9.76E-06
CHRYSENE	0.00420	0.00948	0.054	350	30	1	70	25,550	10,950	1.33E-06	3.01E-06	3.11E-06	7.01E-06
FLUORANTHENE	0.00997	0.02700	0.054	350	30	1	70	25,550	10,950	3.16E-06	8.56E-06	7.37E-06	2.00E-05
PERYLENE	0.00193	0.00420	0.054	350	30	1	70	25,550	10,950	6.12E-07	1.33E-06	1.43E-06	3.11E-06
PHENANTHRENE	0.00353	0.01320	0.054	350	30	1	70	25,550	10,950	1.12E-06	4.18E-06	2.61E-06	9.76E-06
PYRENE	0.00949	0.02400	0.054	350	30	1	70	25,550	10,950	3.01E-06	7.61E-06	7.02E-06	1.78E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.02153	0.06002	0.054	350	30	1	70	25,550	10,950	6.83E-06	1.90E-05	1.59E-05	4.44E-05

TABLE 3-17
CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	34.3034	53.7030	0.054	350	30	1	70	25,550	10,950	1.09E-02	1.70E-02	2.54E-02	3.97E-02
ARSENIC	0.9480	1.2800	0.054	350	30	1	70	25,550	10,950	3.01E-04	4.06E-04	7.01E-04	9.47E-04
CADMIUM	0.1666	0.2025	0.054	350	30	1	70	25,550	10,950	5.28E-05	6.42E-05	1.23E-04	1.50E-04
CHROMIUM	0.4248	0.5031	0.054	350	30	1	70	25,550	10,950	1.35E-04	1.59E-04	3.14E-04	3.72E-04
COPPER	0.6797	0.7830	0.054	350	30	1	70	25,550	10,950	2.15E-04	2.48E-04	5.03E-04	5.79E-04
IRON	68.3140	102.2600	0.054	350	30	1	70	25,550	10,950	2.17E-02	3.24E-02	5.05E-02	7.56E-02
LEAD	0.8230	1.3500	0.054	350	30	1	70	25,550	10,950	2.61E-04	4.28E-04	6.09E-04	9.99E-04
MANGANESE	1.2728	1.6335	0.054	350	30	1	70	25,550	10,950	4.03E-04	5.18E-04	9.41E-04	1.21E-03
MERCURY	0.0611	0.0864	0.054	350	30	1	70	25,550	10,950	1.94E-05	2.74E-05	4.52E-05	6.39E-05
NICKEL	0.1946	0.2925	0.054	350	30	1	70	25,550	10,950	6.17E-05	9.27E-05	1.44E-04	2.16E-04
SILVER	0.0162	0.0214	0.054	350	30	1	70	25,550	10,950	5.14E-06	6.78E-06	1.20E-05	1.58E-05
ZINC	12.2544	18.9000	0.054	350	30	1	70	25,550	10,950	3.88E-03	5.99E-03	9.06E-03	1.40E-02
PESTICIDES													
ALDRIN	0.00085	0.00377	0.054	350	30	1	70	25,550	10,950	2.70E-07	1.20E-06	6.30E-07	2.79E-06
ALPHA-CHLORDANE	0.00078	0.00262	0.054	350	30	1	70	25,550	10,950	2.47E-07	8.30E-07	5.76E-07	1.94E-06
HEXACHLOROBENZENE	0.00113	0.00548	0.054	350	30	1	70	25,550	10,950	3.59E-07	1.74E-06	8.37E-07	4.06E-06
TANS-NONACHLOR	0.00078	0.00265	0.054	350	30	1	70	25,550	10,950	2.49E-07	8.40E-07	5.80E-07	1.96E-06
o,p'-DDD	0.00045	0.00196	0.054	350	30	1	70	25,550	10,950	1.42E-07	6.21E-07	3.32E-07	1.45E-06
p,p'-DDD	0.00254	0.00954	0.054	350	30	1	70	25,550	10,950	8.04E-07	3.03E-06	1.88E-06	7.06E-06
p,p'-DDE	0.00276	0.01038	0.054	350	30	1	70	25,550	10,950	8.76E-07	3.29E-06	2.04E-06	7.68E-06
p,p'-DDT	0.00228	0.00963	0.054	350	30	1	70	25,550	10,950	7.24E-07	3.05E-06	1.69E-06	7.12E-06
POLYAROMATIC HYDROCARBONS													
BENZO(A)ANTHRACENE	0.00338	0.00741	0.054	350	30	1	70	25,550	10,950	1.07E-06	2.35E-06	2.50E-06	5.48E-06
BENZO(A)PYRENE	0.00237	0.00456	0.054	350	30	1	70	25,550	10,950	7.52E-07	1.45E-06	1.76E-06	3.37E-06
BENZO(E)PYRENE	0.00491	0.00767	0.054	350	30	1	70	25,550	10,950	1.56E-06	2.43E-06	3.63E-06	5.67E-06
CHRYSENE	0.00477	0.00948	0.054	350	30	1	70	25,550	10,950	1.51E-06	3.01E-06	3.53E-06	7.01E-06
FLUORANTHENE	0.01084	0.02210	0.054	350	30	1	70	25,550	10,950	3.44E-06	7.01E-06	8.02E-06	1.63E-05
PERYLENE	0.00189	0.00403	0.054	350	30	1	70	25,550	10,950	6.00E-07	1.28E-06	1.40E-06	2.98E-06
PHENANTHRENE	0.00486	0.01320	0.054	350	30	1	70	25,550	10,950	1.54E-06	4.18E-06	3.60E-06	9.76E-06
PYRENE	0.01071	0.02080	0.054	350	30	1	70	25,550	10,950	3.40E-06	6.59E-06	7.92E-06	1.54E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01730	0.02330	0.054	350	30	1	70	25,550	10,950	5.48E-06	7.39E-06	1.28E-05	1.72E-05

TABLE 3-18
CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAXI-MUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	28.1933	58.9860	0.054	350	30	1	70	25,550	10,950	8.94E-03	1.87E-02	2.09E-02	4.36E-02
ARSENIC	0.7221	1.3500	0.054	350	30	1	70	25,550	10,950	2.29E-04	4.28E-04	5.34E-04	9.99E-04
CADMIUM	0.2141	0.3432	0.054	350	30	1	70	25,550	10,950	6.79E-05	1.09E-04	1.58E-04	2.54E-04
CHROMIUM	0.3694	0.4884	0.054	350	30	1	70	25,550	10,950	1.17E-04	1.55E-04	2.73E-04	3.61E-04
COPPER	0.8679	3.1654	0.054	350	30	1	70	25,550	10,950	2.75E-04	1.00E-03	6.42E-04	2.34E-03
IRON	63.4179	128.7000	0.054	350	30	1	70	25,550	10,950	2.01E-02	4.08E-02	4.69E-02	9.52E-02
LEAD	1.0204	3.1200	0.054	350	30	1	70	25,550	10,950	3.23E-04	9.89E-04	7.55E-04	2.31E-03
MANGANESE	1.7297	8.1360	0.054	350	30	1	70	25,550	10,950	5.48E-04	2.58E-03	1.28E-03	6.02E-03
MERCURY	0.0463	0.1096	0.054	350	30	1	70	25,550	10,950	1.47E-05	3.47E-05	3.43E-05	8.11E-05
NICKEL	0.1930	0.3510	0.054	350	30	1	70	25,550	10,950	6.12E-05	1.11E-04	1.43E-04	2.60E-04
SILVER	0.0242	0.2904	0.054	350	30	1	70	25,550	10,950	7.67E-06	9.21E-05	1.79E-05	2.15E-04
ZINC	11.9847	25.0860	0.054	350	30	1	70	25,550	10,950	3.80E-03	7.95E-03	8.87E-03	1.86E-02
PESTICIDES													
ALDRIN	0.00017	0.00045	0.054	350	30	1	70	25,550	10,950	5.45E-08	1.43E-07	1.27E-07	3.33E-07
ALPHA-CHLORDANE	0.00026	0.00081	0.054	350	30	1	70	25,550	10,950	8.08E-08	2.58E-07	1.89E-07	6.02E-07
HEPTACHLOR EPOXIDE	0.00003	0.00025	0.054	350	30	1	70	25,550	10,950	1.05E-08	8.02E-08	2.44E-08	1.87E-07
LINDANE (GAMMA-BHC)	0.00024	0.00414	0.054	350	30	1	70	25,550	10,950	7.55E-08	1.31E-06	1.76E-07	3.06E-06
TRANS-NONACHLOR	0.00025	0.00055	0.054	350	30	1	70	25,550	10,950	7.96E-08	1.74E-07	1.86E-07	4.07E-07
o,p'-DDD	0.00013	0.00082	0.054	350	30	1	70	25,550	10,950	4.22E-08	2.58E-07	9.84E-08	6.03E-07
o,p'-DDE	0.00009	0.00017	0.054	350	30	1	70	25,550	10,950	2.69E-08	5.45E-08	6.29E-08	1.27E-07
o,p'-DDT	0.00039	0.00347	0.054	350	30	1	70	25,550	10,950	1.24E-07	1.10E-06	2.89E-07	2.57E-06
p,p'-DDD	0.00086	0.00228	0.054	350	30	1	70	25,550	10,950	2.73E-07	7.21E-07	6.37E-07	1.68E-06
p,p'-DDE	0.00107	0.00203	0.054	350	30	1	70	25,550	10,950	3.38E-07	6.45E-07	7.89E-07	1.50E-06
p,p'-DDT	0.00133	0.00709	0.054	350	30	1	70	25,550	10,950	4.23E-07	2.25E-06	9.87E-07	5.25E-06
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.00173	0.00649	0.054	350	30	1	70	25,550	10,950	5.49E-07	2.06E-06	1.28E-06	4.80E-06
BENZO(E)PYRENE	0.00356	0.00765	0.054	350	30	1	70	25,550	10,950	1.13E-06	2.43E-06	2.63E-06	5.66E-06
CHRYSENE	0.00373	0.00726	0.054	350	30	1	70	25,550	10,950	1.18E-06	2.30E-06	2.76E-06	5.37E-06
FLUORANTHENE	0.00886	0.01395	0.054	350	30	1	70	25,550	10,950	2.81E-06	4.42E-06	6.55E-06	1.03E-05
PERYLENE	0.00190	0.00420	0.054	350	30	1	70	25,550	10,950	6.01E-07	1.33E-06	1.40E-06	3.11E-06
PHENANTHRENE	0.00349	0.00564	0.054	350	30	1	70	25,550	10,950	1.11E-06	1.79E-06	2.58E-06	4.17E-06
PYRENE	0.00805	0.01328	0.054	350	30	1	70	25,550	10,950	2.55E-06	4.21E-06	5.96E-06	9.82E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01963	0.04847	0.054	350	30	1	70	25,550	10,950	6.22E-06	1.54E-05	1.45E-05	3.59E-05

TABLE 3-19
CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAXI-MUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	30.5080	46.9800	0.054	350	30	1	70	25,550	10,950	9.67E-03	1.49E-02	2.26E-02	3.48E-02
ARSENIC	1.1338	2.2000	0.054	350	30	1	70	25,550	10,950	3.59E-04	6.97E-04	8.39E-04	1.63E-03
CADMIUM	0.2311	0.2904	0.054	350	30	1	70	25,550	10,950	7.33E-05	9.21E-05	1.71E-04	2.15E-04
CHROMIUM	0.4518	0.6040	0.054	350	30	1	70	25,550	10,950	1.43E-04	1.91E-04	3.34E-04	4.47E-04
COPPER	0.8747	1.2684	0.054	350	30	1	70	25,550	10,950	2.77E-04	4.02E-04	6.47E-04	9.38E-04
IRON	65.8938	96.5600	0.054	350	30	1	70	25,550	10,950	2.09E-02	3.06E-02	4.87E-02	7.14E-02
LEAD	1.1333	1.8570	0.054	350	30	1	70	25,550	10,950	3.59E-04	5.89E-04	8.38E-04	1.37E-03
MANGANESE	1.9280	5.6927	0.054	350	30	1	70	25,550	10,950	6.11E-04	1.80E-03	1.43E-03	4.21E-03
MERCURY	0.0375	0.0581	0.054	350	30	1	70	25,550	10,950	1.19E-05	1.84E-05	2.78E-05	4.30E-05
NICKEL	0.2497	0.4681	0.054	350	30	1	70	25,550	10,950	7.92E-05	1.48E-04	1.85E-04	3.46E-04
SILVER	0.1025	0.4077	0.054	350	30	1	70	25,550	10,950	3.25E-05	1.29E-04	7.59E-05	3.02E-04
ZINC	13.8689	18.4800	0.054	350	30	1	70	25,550	10,950	4.40E-03	5.86E-03	1.03E-02	1.37E-02
PESTICIDES													
ALDRIN	0.00018	0.00036	0.054	350	30	1	70	25,550	10,950	5.64E-08	1.14E-07	1.32E-07	2.67E-07
ALPHA-CHLORDANE	0.00054	0.00115	0.054	350	30	1	70	25,550	10,950	1.70E-07	3.66E-07	3.97E-07	8.53E-07
HEPTACHLOR	0.00006	0.00002	0.054	350	30	1	70	25,550	10,950	1.84E-08	6.34E-09	4.29E-08	1.48E-08
HEPTACHLOR EPOXIDE	0.00003	0.00001	0.054	350	30	1	70	25,550	10,950	9.83E-09	1.90E-09	2.29E-08	4.44E-09
HEXACHLOROBENZENE	0.00010	0.00003	0.054	350	30	1	70	25,550	10,950	3.04E-08	1.05E-08	7.10E-08	2.44E-08
LINDANE (GAMMA-BHC)	0.00006	0.00015	0.054	350	30	1	70	25,550	10,950	1.78E-08	4.88E-08	4.14E-08	1.14E-07
MIREX	0.00007	0.00015	0.054	350	30	1	70	25,550	10,950	2.19E-08	4.69E-08	5.10E-08	1.09E-07
TRANS-NONACHLOR	0.00048	0.00121	0.054	350	30	1	70	25,550	10,950	1.52E-07	3.82E-07	3.56E-07	8.91E-07
o,p'-DDD	0.00041	0.00137	0.054	350	30	1	70	25,550	10,950	1.28E-07	4.33E-07	3.00E-07	1.01E-06
o,p'-DDE	0.00007	0.00009	0.054	350	30	1	70	25,550	10,950	2.35E-08	2.69E-08	5.47E-08	6.29E-08
o,p'-DDT	0.00024	0.00061	0.054	350	30	1	70	25,550	10,950	7.45E-08	1.94E-07	1.74E-07	4.53E-07
p,p'-DDD	0.00256	0.00705	0.054	350	30	1	70	25,550	10,950	8.13E-07	2.23E-06	1.90E-06	5.21E-06
p,p'-DDE	0.00173	0.00457	0.054	350	30	1	70	25,550	10,950	5.49E-07	1.45E-06	1.28E-06	3.38E-06
p,p'-DDT	0.00102	0.00229	0.054	350	30	1	70	25,550	10,950	3.22E-07	7.27E-07	7.52E-07	1.70E-06

TABLE 3-19
CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
BENZO(A)ANTHRACENE	0.00220	0.00602	0.054	350	30	1	70	25,550	10,950	6.97E-07	1.91E-06	1.63E-06	4.45E-06
BENZO(E)PYRENE	0.00642	0.01320	0.054	350	30	1	70	25,550	10,950	2.03E-06	4.18E-06	4.75E-06	9.76E-06
CHRYSENE	0.00462	0.00900	0.054	350	30	1	70	25,550	10,950	1.46E-06	2.85E-06	3.42E-06	6.66E-06
FLUORANTHENE	0.01121	0.02700	0.054	350	30	1	70	25,550	10,950	3.55E-06	8.56E-06	8.29E-06	2.00E-05
PERYLENE	0.00204	0.00392	0.054	350	30	1	70	25,550	10,950	6.46E-07	1.24E-06	1.51E-06	2.90E-06
PHENANTHRENE	0.00275	0.00525	0.054	350	30	1	70	25,550	10,950	8.73E-07	1.66E-06	2.04E-06	3.88E-06
PYRENE	0.01107	0.02400	0.054	350	30	1	70	25,550	10,950	3.51E-06	7.61E-06	8.19E-06	1.78E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.02843	0.06000	0.054	350	30	1	70	25,550	10,950	9.01E-06	1.90E-05	2.10E-05	4.44E-05

TABLE 3-20
CONSUMPTION OF MUSSELS CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	24.9303	34.0340	0.054	350	30	1	70	25,550	10,950	7.90E-03	1.08E-02	1.84E-02	2.52E-02
ARSENIC	0.5513	0.9700	0.054	350	30	1	70	25,550	10,950	1.75E-04	3.08E-04	4.08E-04	7.18E-04
CADMIUM	0.1914	0.2156	0.054	350	30	1	70	25,550	10,950	6.07E-05	6.84E-05	1.42E-04	1.59E-04
CHROMIUM	0.2633	0.3388	0.054	350	30	1	70	25,550	10,950	8.35E-05	1.07E-04	1.95E-04	2.51E-04
COPPER	0.8603	0.9548	0.054	350	30	1	70	25,550	10,950	2.73E-04	3.03E-04	6.36E-04	7.06E-04
IRON	50.7650	62.0600	0.054	350	30	1	70	25,550	10,950	1.61E-02	1.97E-02	3.76E-02	4.59E-02
LEAD	0.2625	0.3850	0.054	350	30	1	70	25,550	10,950	8.32E-05	1.22E-04	1.94E-04	2.85E-04
MANGANESE	1.1895	1.4500	0.054	350	30	1	70	25,550	10,950	3.77E-04	4.60E-04	8.80E-04	1.07E-03
MERCURY	0.0423	0.0678	0.054	350	30	1	70	25,550	10,950	1.34E-05	2.15E-05	3.13E-05	5.02E-05
NICKEL	0.1549	0.2002	0.054	350	30	1	70	25,550	10,950	4.91E-05	6.35E-05	1.15E-04	1.48E-04
SILVER	0.0133	0.0181	0.054	350	30	1	70	25,550	10,950	4.22E-06	5.74E-06	9.86E-06	1.34E-05
ZINC	11.3873	12.9630	0.054	350	30	1	70	25,550	10,950	3.61E-03	4.11E-03	8.42E-03	9.59E-03
PESTICIDES													
ALDRIN	0.00009	0.00020	0.054	350	30	1	70	25,550	10,950	2.75E-08	6.28E-08	6.42E-08	1.46E-07
ALPHA-CHLORDANE	0.00039	0.00101	0.054	350	30	1	70	25,550	10,950	1.22E-07	3.20E-07	2.85E-07	7.48E-07
HEPTACHLOR	0.00023	0.00077	0.054	350	30	1	70	25,550	10,950	7.29E-08	2.43E-07	1.70E-07	5.66E-07
TRANS-NONACHLOR	0.00057	0.00117	0.054	350	30	1	70	25,550	10,950	1.82E-07	3.70E-07	4.24E-07	8.63E-07
o,p'-DDD	0.00031	0.00053	0.054	350	30	1	70	25,550	10,950	9.70E-08	1.68E-07	2.26E-07	3.92E-07
o,p'-DDT	0.00010	0.00023	0.054	350	30	1	70	25,550	10,950	3.25E-08	7.45E-08	7.58E-08	1.74E-07
p,p'-DDD	0.00078	0.00100	0.054	350	30	1	70	25,550	10,950	2.48E-07	3.16E-07	5.79E-07	7.38E-07
p,p'-DDE	0.00073	0.00089	0.054	350	30	1	70	25,550	10,950	2.31E-07	2.84E-07	5.39E-07	6.62E-07
p,p'-DDT	0.00110	0.00296	0.054	350	30	1	70	25,550	10,950	3.50E-07	9.37E-07	8.17E-07	2.19E-06
POLYAROMATIC HYDROCARBONS													
FLUORANTHENE	0.00501	0.00705	0.054	350	30	1	70	25,550	10,950	1.59E-06	2.24E-06	3.70E-06	5.22E-06
PHENANTHRENE	0.00345	0.00645	0.054	350	30	1	70	25,550	10,950	1.09E-06	2.04E-06	2.55E-06	4.77E-06
PYRENE	0.00321	0.00570	0.054	350	30	1	70	25,550	10,950	1.02E-06	1.81E-06	2.37E-06	4.22E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01367	0.01663	0.054	350	30	1	70	25,550	10,950	4.33E-06	5.27E-06	1.01E-05	1.23E-05

TABLE 3-21
CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	44.0878	66.2340	0.054	350	30	1	70	25,550	10,950	1.40E-02	2.10E-02	3.26E-02	4.90E-02
ARSENIC	1.0940	1.7800	0.054	350	30	1	70	25,550	10,950	3.47E-04	5.64E-04	8.09E-04	1.32E-03
CADMIUM	0.2761	0.4214	0.054	350	30	1	70	25,550	10,950	8.75E-05	1.34E-04	2.04E-04	3.12E-04
CHROMIUM	0.6153	0.8428	0.054	350	30	1	70	25,550	10,950	1.95E-04	2.67E-04	4.55E-04	6.23E-04
COPPER	0.9787	1.1220	0.054	350	30	1	70	25,550	10,950	3.10E-04	3.56E-04	7.24E-04	8.30E-04
IRON	88.9800	121.9800	0.054	350	30	1	70	25,550	10,950	2.82E-02	3.87E-02	6.58E-02	9.02E-02
LEAD	0.5278	0.6610	0.054	350	30	1	70	25,550	10,950	1.67E-04	2.10E-04	3.90E-04	4.89E-04
MANGANESE	5.7381	11.2700	0.054	350	30	1	70	25,550	10,950	1.82E-03	3.57E-03	4.24E-03	8.34E-03
MERCURY	0.0402	0.0570	0.054	350	30	1	70	25,550	10,950	1.27E-05	1.81E-05	2.97E-05	4.22E-05
NICKEL	0.2703	0.3078	0.054	350	30	1	70	25,550	10,950	8.57E-05	9.76E-05	2.00E-04	2.28E-04
SILVER	0.2063	0.2744	0.054	350	30	1	70	25,550	10,950	6.54E-05	8.70E-05	1.53E-04	2.03E-04
ZINC	14.7860	18.7440	0.054	350	30	1	70	25,550	10,950	4.69E-03	5.94E-03	1.09E-02	1.39E-02
PESTICIDES													
ALDRIN	0.00026	0.00030	0.054	350	30	1	70	25,550	10,950	8.34E-08	9.35E-08	1.95E-07	2.18E-07
ALPHA-CHLORDANE	0.00072	0.00097	0.054	350	30	1	70	25,550	10,950	2.28E-07	3.07E-07	5.33E-07	7.17E-07
LINDANE (GAMMA-BHC)	0.00013	0.00051	0.054	350	30	1	70	25,550	10,950	4.18E-08	1.62E-07	9.76E-08	3.78E-07
TRANS-NONACHLOR	0.00059	0.00087	0.054	350	30	1	70	25,550	10,950	1.87E-07	2.75E-07	4.36E-07	6.42E-07
o,p'-DDD	0.00027	0.00050	0.054	350	30	1	70	25,550	10,950	8.56E-08	1.57E-07	2.00E-07	3.67E-07
o,p'-DDT	0.00009	0.00024	0.054	350	30	1	70	25,550	10,950	2.85E-08	7.74E-08	6.66E-08	1.80E-07
p,p'-DDD	0.00165	0.00249	0.054	350	30	1	70	25,550	10,950	5.22E-07	7.90E-07	1.22E-06	1.84E-06
p,p'-DDE	0.00241	0.00449	0.054	350	30	1	70	25,550	10,950	7.62E-07	1.42E-06	1.78E-06	3.32E-06
p,p'-DDT	0.00063	0.00161	0.054	350	30	1	70	25,550	10,950	2.00E-07	5.10E-07	4.68E-07	1.19E-06
POLYAROMATIC HYDROCARBONS													
BENZO(A)ANTHRACENE	0.00592	0.01200	0.054	350	30	1	70	25,550	10,950	1.88E-06	3.80E-06	4.38E-06	8.88E-06
BENZO(A)PYRENE	0.00693	0.01200	0.054	350	30	1	70	25,550	10,950	2.20E-06	3.80E-06	5.13E-06	8.88E-06
BENZO(E)PYRENE	0.01504	0.02800	0.054	350	30	1	70	25,550	10,950	4.77E-06	8.88E-06	1.11E-05	2.07E-05
CHRYSENE	0.00914	0.01600	0.054	350	30	1	70	25,550	10,950	2.90E-06	5.07E-06	6.76E-06	1.18E-05
FLUORANTHENE	0.01168	0.01800	0.054	350	30	1	70	25,550	10,950	3.70E-06	5.71E-06	8.64E-06	1.33E-05
PERYLENE	0.00723	0.01100	0.054	350	30	1	70	25,550	10,950	2.29E-06	3.49E-06	5.35E-06	8.14E-06
PHENANTHRENE	0.00158	0.00418	0.054	350	30	1	70	25,550	10,950	5.02E-07	1.33E-06	1.17E-06	3.09E-06
PYRENE	0.01756	0.03500	0.054	350	30	1	70	25,550	10,950	5.57E-06	1.11E-05	1.30E-05	2.59E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.00901	0.03629	0.054	350	30	1	70	25,550	10,950	2.86E-06	1.15E-05	6.66E-06	2.68E-05

TABLE 3-22

Consumption of Locally Caught Mussels For Subsistence Fishing
Residential Exposures, Off-Site, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value
IR	=	0.132 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year subsistence (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a)
		365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-22
CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	29.9680	58.9860	0.132	350	30	1	70	25,550	10,950	2.32E-02	4.57E-02	5.42E-02	1.07E-01
ARSENIC	0.8652	2.2000	0.132	350	30	1	70	25,550	10,950	6.70E-04	1.70E-03	1.56E-03	3.98E-03
CADMIUM	0.2062	0.3432	0.132	350	30	1	70	25,550	10,950	1.60E-04	2.66E-04	3.73E-04	6.21E-04
CHROMIUM	0.4021	0.6040	0.132	350	30	1	70	25,550	10,950	3.12E-04	4.68E-04	7.27E-04	1.09E-03
COPPER	0.8333	3.1654	0.132	350	30	1	70	25,550	10,950	6.46E-04	2.45E-03	1.51E-03	5.72E-03
IRON	65.1706	128.7000	0.132	350	30	1	70	25,550	10,950	5.05E-02	9.97E-02	1.18E-01	2.33E-01
LEAD	1.0316	3.1200	0.132	350	30	1	70	25,550	10,950	7.99E-04	2.42E-03	1.87E-03	5.64E-03
MANGANESE	1.7338	8.1360	0.132	350	30	1	70	25,550	10,950	1.34E-03	6.31E-03	3.14E-03	1.47E-02
MERCURY	0.0465	0.1096	0.132	350	30	1	70	25,550	10,950	3.60E-05	8.49E-05	8.41E-05	1.98E-04
NICKEL	0.2099	0.4681	0.132	350	30	1	70	25,550	10,950	1.63E-04	3.63E-04	3.79E-04	8.46E-04
SILVER	0.0430	0.4077	0.132	350	30	1	70	25,550	10,950	3.34E-05	3.16E-04	7.78E-05	7.37E-04
ZINC	12.5182	25.0860	0.132	350	30	1	70	25,550	10,950	9.70E-03	1.94E-02	2.26E-02	4.54E-02
PESTICIDES													
ALDRIN	0.00028	0.00377	0.132	350	30	1	70	25,550	10,950	2.13E-07	2.92E-06	4.97E-07	6.82E-06
ALPHA-CHLORDANE	0.00040	0.00262	0.132	350	30	1	70	25,550	10,950	3.06E-07	2.03E-06	7.14E-07	4.74E-06
HEPTACHLOR	0.00007	0.00002	0.132	350	30	1	70	25,550	10,950	5.04E-08	1.63E-08	1.18E-07	3.80E-08
HEPTACHLOR EPOXIDE	0.00004	0.00025	0.132	350	30	1	70	25,550	10,950	2.79E-08	1.96E-07	6.51E-08	4.57E-07
HEXACHLOROBENZENE	0.00022	0.00548	0.132	350	30	1	70	25,550	10,950	1.74E-07	4.25E-06	4.05E-07	9.92E-06
LINDANE (GAMMA-BHC)	0.00017	0.00414	0.132	350	30	1	70	25,550	10,950	1.33E-07	3.21E-06	3.11E-07	7.49E-06
MIREX	0.00008	0.00015	0.132	350	30	1	70	25,550	10,950	6.43E-08	1.15E-07	1.50E-07	2.69E-07
TRANS-NONACHLOR	0.00038	0.00265	0.132	350	30	1	70	25,550	10,950	2.97E-07	2.05E-06	6.93E-07	4.79E-06
o,p'-DDD	0.00025	0.00196	0.132	350	30	1	70	25,550	10,950	1.91E-07	1.52E-06	4.45E-07	3.54E-06
o,p'-DDE	0.00009	0.00017	0.132	350	30	1	70	25,550	10,950	7.13E-08	1.33E-07	1.66E-07	3.11E-07
o,p'-DDT	0.00031	0.00347	0.132	350	30	1	70	25,550	10,950	2.43E-07	2.69E-06	5.68E-07	6.28E-06
p,p'-DDD	0.00150	0.00954	0.132	350	30	1	70	25,550	10,950	1.16E-06	7.40E-06	2.72E-06	1.73E-05
p,p'-DDE	0.00147	0.01038	0.132	350	30	1	70	25,550	10,950	1.14E-06	8.05E-06	2.66E-06	1.88E-05
p,p'-DDT	0.00138	0.00963	0.132	350	30	1	70	25,550	10,950	1.07E-06	7.46E-06	2.50E-06	1.74E-05

TABLE 3-22
CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAXI-MUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.00115	0.00649	0.132	350	30	1	70	25,550	10,950	8.88E-07	5.03E-06	2.07E-06	1.17E-05
BENZO(A)ANTHRACENE	0.00206	0.00741	0.132	350	30	1	70	25,550	10,950	1.60E-06	5.74E-06	3.73E-06	1.34E-05
BENZO(A)PYRENE	0.00134	0.00456	0.132	350	30	1	70	25,550	10,950	1.04E-06	3.53E-06	2.42E-06	8.25E-06
BENZO(E)PYRENE	0.00470	0.01320	0.132	350	30	1	70	25,550	10,950	3.64E-06	1.02E-05	8.49E-06	2.39E-05
CHRYSENE	0.00420	0.00948	0.132	350	30	1	70	25,550	10,950	3.26E-06	7.35E-06	7.60E-06	1.71E-05
FLUORANTHENE	0.00997	0.02700	0.132	350	30	1	70	25,550	10,950	7.72E-06	2.09E-05	1.80E-05	4.88E-05
PERYLENE	0.00193	0.00420	0.132	350	30	1	70	25,550	10,950	1.49E-06	3.25E-06	3.49E-06	7.59E-06
PHENANTHRENE	0.00353	0.01320	0.132	350	30	1	70	25,550	10,950	2.73E-06	1.02E-05	6.38E-06	2.39E-05
PYRENE	0.00949	0.02400	0.132	350	30	1	70	25,550	10,950	7.36E-06	1.86E-05	1.72E-05	4.34E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.02153	0.06002	0.132	350	30	1	70	25,550	10,950	1.67E-05	4.65E-05	3.89E-05	1.09E-04

TABLE 3-23
CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	34.3034	53.7030	0.381	365	30	1	70	25,550	10,950	8.00E-02	1.25E-01	1.87E-01	2.92E-01
ARSENIC	0.9480	1.2800	0.381	365	30	1	70	25,550	10,950	2.21E-03	2.99E-03	5.16E-03	6.97E-03
CADMIUM	0.1666	0.2025	0.381	365	30	1	70	25,550	10,950	3.89E-04	4.72E-04	9.07E-04	1.10E-03
CHROMIUM	0.4248	0.5031	0.381	365	30	1	70	25,550	10,950	9.91E-04	1.17E-03	2.31E-03	2.74E-03
COPPER	0.6797	0.7830	0.381	365	30	1	70	25,550	10,950	1.59E-03	1.83E-03	3.70E-03	4.26E-03
IRON	68.3140	102.2600	0.381	365	30	1	70	25,550	10,950	1.59E-01	2.39E-01	3.72E-01	5.57E-01
LEAD	0.8230	1.3500	0.381	365	30	1	70	25,550	10,950	1.92E-03	3.15E-03	4.48E-03	7.35E-03
MANGANESE	1.2728	1.6335	0.381	365	30	1	70	25,550	10,950	2.97E-03	3.81E-03	6.93E-03	8.89E-03
MERCURY	0.0611	0.0864	0.381	365	30	1	70	25,550	10,950	1.42E-04	2.02E-04	3.32E-04	4.70E-04
NICKEL	0.1946	0.2925	0.381	365	30	1	70	25,550	10,950	4.54E-04	6.82E-04	1.06E-03	1.59E-03
SILVER	0.0162	0.0214	0.381	365	30	1	70	25,550	10,950	3.78E-05	4.99E-05	8.83E-05	1.16E-04
ZINC	12.2544	18.9000	0.381	365	30	1	70	25,550	10,950	2.86E-02	4.41E-02	6.67E-02	1.03E-01
PESTICIDES													
ALDRIN	0.00085	0.00377	0.381	365	30	1	70	25,550	10,950	1.99E-06	8.80E-06	4.63E-06	2.05E-05
ALPHA-CHLORDANE	0.00078	0.00262	0.381	365	30	1	70	25,550	10,950	1.81E-06	6.11E-06	4.23E-06	1.43E-05
HEXACHLOROBENZENE	0.00113	0.00548	0.381	365	30	1	70	25,550	10,950	2.64E-06	1.28E-05	6.16E-06	2.98E-05
TANS-NONACHLOR	0.00078	0.00265	0.381	365	30	1	70	25,550	10,950	1.83E-06	6.18E-06	4.27E-06	1.44E-05
o,p'-DDD	0.00045	0.00196	0.381	365	30	1	70	25,550	10,950	1.05E-06	4.57E-06	2.44E-06	1.07E-05
p,p'-DDD	0.00254	0.00954	0.381	365	30	1	70	25,550	10,950	5.91E-06	2.23E-05	1.38E-05	5.19E-05
p,p'-DDE	0.00276	0.01038	0.381	365	30	1	70	25,550	10,950	6.45E-06	2.42E-05	1.50E-05	5.65E-05
p,p'-DDT	0.00228	0.00963	0.381	365	30	1	70	25,550	10,950	5.33E-06	2.25E-05	1.24E-05	5.24E-05
POLYAROMATIC HYDROCARBONS													
BENZO(A)ANTHRACENE	0.00338	0.00741	0.381	365	30	1	70	25,550	10,950	7.88E-06	1.73E-05	1.84E-05	4.03E-05
BENZO(A)PYRENE	0.00237	0.00456	0.381	365	30	1	70	25,550	10,950	5.54E-06	1.06E-05	1.29E-05	2.48E-05
BENZO(E)PYRENE	0.00491	0.00767	0.381	365	30	1	70	25,550	10,950	1.14E-05	1.79E-05	2.67E-05	4.17E-05
CHRYSENE	0.00477	0.00948	0.381	365	30	1	70	25,550	10,950	1.11E-05	2.21E-05	2.60E-05	5.16E-05
FLUORANTHENE	0.01084	0.02210	0.381	365	30	1	70	25,550	10,950	2.53E-05	5.16E-05	5.90E-05	1.20E-04
PERYLENE	0.00189	0.00403	0.381	365	30	1	70	25,550	10,950	4.41E-06	9.40E-06	1.03E-05	2.19E-05
PHENANTHRENE	0.00486	0.01320	0.381	365	30	1	70	25,550	10,950	1.13E-05	3.08E-05	2.65E-05	7.18E-05
PYRENE	0.01071	0.02080	0.381	365	30	1	70	25,550	10,950	2.50E-05	4.85E-05	5.83E-05	1.13E-04
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01730	0.02330	0.381	365	30	1	70	25,550	10,950	4.04E-05	5.44E-05	9.42E-05	1.27E-04

TABLE 3-24
CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	28.1933	58.9860	0.381	365	30	1	70	25,550	10,950	6.58E-02	1.38E-01	1.53E-01	3.21E-01
ARSENIC	0.7221	1.3500	0.381	365	30	1	70	25,550	10,950	1.68E-03	3.15E-03	3.93E-03	7.35E-03
CADMIUM	0.2141	0.3432	0.381	365	30	1	70	25,550	10,950	4.99E-04	8.01E-04	1.17E-03	1.87E-03
CHROMIUM	0.3694	0.4884	0.381	365	30	1	70	25,550	10,950	8.62E-04	1.14E-03	2.01E-03	2.66E-03
COPPER	0.8679	3.1654	0.381	365	30	1	70	25,550	10,950	2.02E-03	7.38E-03	4.72E-03	1.72E-02
IRON	63.4179	128.7000	0.381	365	30	1	70	25,550	10,950	1.48E-01	3.00E-01	3.45E-01	7.00E-01
LEAD	1.0204	3.1200	0.381	365	30	1	70	25,550	10,950	2.38E-03	7.28E-03	5.55E-03	1.70E-02
MANGANESE	1.7297	8.1360	0.381	365	30	1	70	25,550	10,950	4.03E-03	1.90E-02	9.41E-03	4.43E-02
MERCURY	0.0463	0.1096	0.381	365	30	1	70	25,550	10,950	1.08E-04	2.56E-04	2.52E-04	5.97E-04
NICKEL	0.1930	0.3510	0.381	365	30	1	70	25,550	10,950	4.50E-04	8.19E-04	1.05E-03	1.91E-03
SILVER	0.0242	0.2904	0.381	365	30	1	70	25,550	10,950	5.64E-05	6.77E-04	1.32E-04	1.58E-03
ZINC	11.9847	25.0860	0.381	365	30	1	70	25,550	10,950	2.80E-02	5.85E-02	6.52E-02	1.37E-01
PESTICIDES													
ALDRIN	0.00017	0.00045	0.381	365	30	1	70	25,550	10,950	4.01E-07	1.05E-06	9.36E-07	2.45E-06
ALPHA-CHLORDANE	0.00026	0.00081	0.381	365	30	1	70	25,550	10,950	5.95E-07	1.90E-06	1.39E-06	4.43E-06
HEPTACHLOR EPOXIDE	0.00003	0.00025	0.381	365	30	1	70	25,550	10,950	7.70E-08	5.90E-07	1.80E-07	1.38E-06
LINDANE (GAMMA-BHC)	0.00024	0.00414	0.381	365	30	1	70	25,550	10,950	5.55E-07	9.66E-06	1.30E-06	2.25E-05
TRANS-NONACHLOR	0.00025	0.00055	0.381	365	30	1	70	25,550	10,950	5.85E-07	1.28E-06	1.37E-06	2.99E-06
o,p'-DDD	0.00013	0.00082	0.381	365	30	1	70	25,550	10,950	3.10E-07	1.90E-06	7.24E-07	4.44E-06
o,p'-DDE	0.00009	0.00017	0.381	365	30	1	70	25,550	10,950	1.98E-07	4.01E-07	4.63E-07	9.36E-07
o,p'-DDT	0.00039	0.00347	0.381	365	30	1	70	25,550	10,950	9.12E-07	8.10E-06	2.13E-06	1.89E-05
p,p'-DDD	0.00086	0.00228	0.381	365	30	1	70	25,550	10,950	2.01E-06	5.31E-06	4.69E-06	1.24E-05
p,p'-DDE	0.00107	0.00203	0.381	365	30	1	70	25,550	10,950	2.49E-06	4.74E-06	5.81E-06	1.11E-05
p,p'-DDT	0.00133	0.00709	0.381	365	30	1	70	25,550	10,950	3.11E-06	1.65E-05	7.26E-06	3.86E-05
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.00173	0.00649	0.381	365	30	1	70	25,550	10,950	4.04E-06	1.51E-05	9.43E-06	3.53E-05
BENZO(E)PYRENE	0.00356	0.00765	0.381	365	30	1	70	25,550	10,950	8.30E-06	1.78E-05	1.94E-05	4.16E-05
CHRYSENE	0.00373	0.00726	0.381	365	30	1	70	25,550	10,950	8.70E-06	1.69E-05	2.03E-05	3.95E-05
FLUORANTHENE	0.00886	0.01395	0.381	365	30	1	70	25,550	10,950	2.07E-05	3.25E-05	4.82E-05	7.59E-05
PERYLENE	0.00190	0.00420	0.381	365	30	1	70	25,550	10,950	4.42E-06	9.80E-06	1.03E-05	2.29E-05
PHENANTHRENE	0.00349	0.00564	0.381	365	30	1	70	25,550	10,950	8.15E-06	1.32E-05	1.90E-05	3.07E-05
PYRENE	0.00805	0.01328	0.381	365	30	1	70	25,550	10,950	1.88E-05	3.10E-05	4.38E-05	7.23E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01963	0.04847	0.381	365	30	1	70	25,550	10,950	4.58E-05	1.13E-04	1.07E-04	2.64E-04

TABLE 3-25
CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	30.5080	46.9800	0.381	365	30	1	70	25,550	10,950	7.12E-02	1.10E-01	1.66E-01	2.56E-01
ARSENIC	1.1338	2.2000	0.381	365	30	1	70	25,550	10,950	2.64E-03	5.13E-03	6.17E-03	1.20E-02
CADMIUM	0.2311	0.2904	0.381	365	30	1	70	25,550	10,950	5.39E-04	6.77E-04	1.26E-03	1.58E-03
CHROMIUM	0.4518	0.6040	0.381	365	30	1	70	25,550	10,950	1.05E-03	1.41E-03	2.46E-03	3.29E-03
COPPER	0.8747	1.2684	0.381	365	30	1	70	25,550	10,950	2.04E-03	2.96E-03	4.76E-03	6.90E-03
IRON	65.8938	96.5600	0.381	365	30	1	70	25,550	10,950	1.54E-01	2.25E-01	3.59E-01	5.26E-01
LEAD	1.1333	1.8570	0.381	365	30	1	70	25,550	10,950	2.64E-03	4.33E-03	6.17E-03	1.01E-02
MANGANESE	1.9280	5.6927	0.381	365	30	1	70	25,550	10,950	4.50E-03	1.33E-02	1.05E-02	3.10E-02
MERCURY	0.0375	0.0581	0.381	365	30	1	70	25,550	10,950	8.76E-05	1.36E-04	2.04E-04	3.16E-04
NICKEL	0.2497	0.4681	0.381	365	30	1	70	25,550	10,950	5.82E-04	1.09E-03	1.36E-03	2.55E-03
SILVER	0.1025	0.4077	0.381	365	30	1	70	25,550	10,950	2.39E-04	9.51E-04	5.58E-04	2.22E-03
ZINC	13.8689	18.4800	0.381	365	30	1	70	25,550	10,950	3.24E-02	4.31E-02	7.55E-02	1.01E-01
PESTICIDES													
ALDRIN	0.00018	0.00036	0.381	365	30	1	70	25,550	10,950	4.15E-07	8.42E-07	9.69E-07	1.96E-06
ALPHA-CHLORDANE	0.00054	0.00115	0.381	365	30	1	70	25,550	10,950	1.25E-06	2.69E-06	2.92E-06	6.28E-06
HEPTACHLOR	0.00006	0.00002	0.381	365	30	1	70	25,550	10,950	1.35E-07	4.67E-08	3.16E-07	1.09E-07
HEPTACHLOR EPOXIDE	0.00003	0.00001	0.381	365	30	1	70	25,550	10,950	7.23E-08	1.40E-08	1.69E-07	3.27E-08
HEXACHLOROBENZENE	0.00010	0.00003	0.381	365	30	1	70	25,550	10,950	2.24E-07	7.70E-08	5.23E-07	1.80E-07
LINDANE (GAMMA-BHC)	0.00006	0.00015	0.381	365	30	1	70	25,550	10,950	1.31E-07	3.59E-07	3.05E-07	8.38E-07
MIREX	0.00007	0.00015	0.381	365	30	1	70	25,550	10,950	1.61E-07	3.45E-07	3.76E-07	8.06E-07
TRANS-NONACHLOR	0.00048	0.00121	0.381	365	30	1	70	25,550	10,950	1.12E-06	2.81E-06	2.62E-06	6.56E-06
o,p'-DDD	0.00041	0.00137	0.381	365	30	1	70	25,550	10,950	9.45E-07	3.18E-06	2.20E-06	7.43E-06
o,p'-DDE	0.00007	0.00009	0.381	365	30	1	70	25,550	10,950	1.73E-07	1.98E-07	4.03E-07	4.63E-07
o,p'-DDT	0.00024	0.00061	0.381	365	30	1	70	25,550	10,950	5.48E-07	1.43E-06	1.28E-06	3.34E-06
p,p'-DDD	0.00256	0.00705	0.381	365	30	1	70	25,550	10,950	5.98E-06	1.64E-05	1.40E-05	3.84E-05
p,p'-DDE	0.00173	0.00457	0.381	365	30	1	70	25,550	10,950	4.04E-06	1.07E-05	9.42E-06	2.49E-05
p,p'-DDT	0.00102	0.00229	0.381	365	30	1	70	25,550	10,950	2.37E-06	5.35E-06	5.53E-06	1.25E-05

TABLE 3-25
CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS													
BENZO(A)ANTHRACENE	0.00220	0.00602	0.381	365	30	1	70	25,550	10,950	5.13E-06	1.40E-05	1.20E-05	3.28E-05
BENZO(E)PYRENE	0.00642	0.01320	0.381	365	30	1	70	25,550	10,950	1.50E-05	3.08E-05	3.49E-05	7.18E-05
CHRYSENE	0.00462	0.00900	0.381	365	30	1	70	25,550	10,950	1.08E-05	2.10E-05	2.51E-05	4.90E-05
FLUORANTHENE	0.01121	0.02700	0.381	365	30	1	70	25,550	10,950	2.62E-05	6.30E-05	6.10E-05	1.47E-04
PERYLENE	0.00204	0.00392	0.381	365	30	1	70	25,550	10,950	4.76E-06	9.14E-06	1.11E-05	2.13E-05
PHENANTHRENE	0.00275	0.00525	0.381	365	30	1	70	25,550	10,950	6.42E-06	1.22E-05	1.50E-05	2.86E-05
PYRENE	0.01107	0.02400	0.381	365	30	1	70	25,550	10,950	2.58E-05	5.60E-05	6.03E-05	1.31E-04
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.02843	0.06000	0.381	365	30	1	70	25,550	10,950	6.63E-05	1.40E-04	1.55E-04	3.27E-04

TABLE 3-26
CONSUMPTION OF MUSSELS CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAXI-MUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	24.9303	34.0340	0.381	365	30	1	70	25,550	10,950	5.82E-02	7.94E-02	1.36E-01	1.85E-01
ARSENIC	0.5513	0.9700	0.381	365	30	1	70	25,550	10,950	1.29E-03	2.26E-03	3.00E-03	5.28E-03
CADMIUM	0.1914	0.2156	0.381	365	30	1	70	25,550	10,950	4.46E-04	5.03E-04	1.04E-03	1.17E-03
CHROMIUM	0.2633	0.3388	0.381	365	30	1	70	25,550	10,950	6.14E-04	7.90E-04	1.43E-03	1.84E-03
COPPER	0.8603	0.9548	0.381	365	30	1	70	25,550	10,950	2.01E-03	2.23E-03	4.68E-03	5.20E-03
IRON	50.7650	62.0600	0.381	365	30	1	70	25,550	10,950	1.18E-01	1.45E-01	2.76E-01	3.38E-01
LEAD	0.2625	0.3850	0.381	365	30	1	70	25,550	10,950	6.12E-04	8.98E-04	1.43E-03	2.10E-03
MANGANESE	1.1895	1.4500	0.381	365	30	1	70	25,550	10,950	2.77E-03	3.38E-03	6.47E-03	7.89E-03
MERCURY	0.0423	0.0678	0.381	365	30	1	70	25,550	10,950	9.86E-05	1.58E-04	2.30E-04	3.69E-04
NICKEL	0.1549	0.2002	0.381	365	30	1	70	25,550	10,950	3.61E-04	4.67E-04	8.43E-04	1.09E-03
SILVER	0.0133	0.0181	0.381	365	30	1	70	25,550	10,950	3.11E-05	4.22E-05	7.25E-05	9.85E-05
ZINC	11.3873	12.9630	0.381	365	30	1	70	25,550	10,950	2.66E-02	3.02E-02	6.20E-02	7.06E-02
PESTICIDES													
ALDRIN	0.00009	0.00020	0.381	365	30	1	70	25,650	10,950	2.02E-07	4.62E-07	4.72E-07	1.08E-06
ALPHA-CHLORDANE	0.00039	0.00101	0.381	365	30	1	70	25,550	10,950	8.98E-07	2.36E-06	2.10E-06	5.50E-06
HEPTACHLOR	0.00023	0.00077	0.381	365	30	1	70	25,550	10,950	5.36E-07	1.78E-06	1.25E-06	4.16E-06
TRANS-NONACHLOR	0.00057	0.00117	0.381	365	30	1	70	25,550	10,950	1.34E-06	2.72E-06	3.12E-06	6.35E-06
o,p'-DDD	0.00031	0.00053	0.381	365	30	1	70	25,550	10,950	7.14E-07	1.24E-06	1.67E-06	2.88E-06
o,p'-DDT	0.00010	0.00023	0.381	365	30	1	70	25,550	10,950	2.39E-07	5.48E-07	5.57E-07	1.28E-06
p,p'-DDD	0.00078	0.00100	0.381	365	30	1	70	25,550	10,950	1.83E-06	2.33E-06	4.26E-06	5.43E-06
p,p'-DDE	0.00073	0.00089	0.381	365	30	1	70	25,550	10,950	1.70E-06	2.09E-06	3.97E-06	4.87E-06
p,p'-DDT	0.00110	0.00296	0.381	365	30	1	70	25,550	10,950	2.58E-06	6.90E-06	6.01E-06	1.61E-05
POLYAROMATIC HYDROCARBONS													
FLUORANTHENE	0.00501	0.00705	0.381	365	30	1	70	25,550	10,950	1.17E-05	1.64E-05	2.72E-05	3.84E-05
PHENANTHRENE	0.00345	0.00645	0.381	365	30	1	70	25,550	10,950	8.05E-06	1.50E-05	1.88E-05	3.51E-05
PYRENE	0.00321	0.00570	0.381	365	30	1	70	25,550	10,950	7.48E-06	1.33E-05	1.74E-05	3.10E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01367	0.01663	0.381	365	30	1	70	25,550	10,950	3.19E-05	3.88E-05	7.44E-05	9.05E-05

TABLE 3-27
CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

								AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	44.0878	66.2340	0.381	365	30	1	70	25,550	10,950	1.03E-01	1.55E-01	2.40E-01	3.61E-01
ARSENIC	1.0940	1.7800	0.381	365	30	1	70	25,550	10,950	2.55E-03	4.15E-03	5.95E-03	9.69E-03
CADMIUM	0.2761	0.4214	0.381	365	30	1	70	25,550	10,950	6.44E-04	9.83E-04	1.50E-03	2.29E-03
CHROMIUM	0.6153	0.8428	0.381	365	30	1	70	25,550	10,950	1.44E-03	1.97E-03	3.35E-03	4.59E-03
COPPER	0.9787	1.1220	0.381	365	30	1	70	25,550	10,950	2.28E-03	2.62E-03	5.33E-03	6.11E-03
IRON	88.9800	121.9800	0.381	365	30	1	70	25,550	10,950	2.08E-01	2.85E-01	4.84E-01	6.64E-01
LEAD	0.5278	0.6610	0.381	365	30	1	70	25,550	10,950	1.23E-03	1.54E-03	2.87E-03	3.60E-03
MANGANESE	5.7381	11.2700	0.381	365	30	1	70	25,550	10,950	1.34E-02	2.63E-02	3.12E-02	6.13E-02
MERCURY	0.0402	0.0570	0.381	365	30	1	70	25,550	10,950	9.38E-05	1.33E-04	2.19E-04	3.10E-04
NICKEL	0.2703	0.3078	0.381	365	30	1	70	25,550	10,950	6.30E-04	7.18E-04	1.47E-03	1.68E-03
SILVER	0.2063	0.2744	0.381	365	30	1	70	25,550	10,950	4.81E-04	6.40E-04	1.12E-03	1.49E-03
ZINC	14.7860	18.7440	0.381	365	30	1	70	25,550	10,950	3.45E-02	4.37E-02	8.05E-02	1.02E-01
PESTICIDES													
ALDRIN	0.00026	0.00030	0.381	365	30	1	70	25,550	10,950	6.13E-07	6.88E-07	1.43E-06	1.61E-06
ALPHA-CHLORDANE	0.00072	0.00097	0.381	365	30	1	70	25,550	10,950	1.68E-06	2.26E-06	3.92E-06	5.27E-06
LINDANE (GAMMA-BHC)	0.00013	0.00051	0.381	365	30	1	70	25,550	10,950	3.08E-07	1.19E-06	7.18E-07	2.78E-06
TRANS-NONACHLOR	0.00059	0.00087	0.381	365	30	1	70	25,550	10,950	1.38E-06	2.02E-06	3.21E-06	4.72E-06
o,p'-DDD	0.00027	0.00050	0.381	365	30	1	70	25,550	10,950	6.30E-07	1.16E-06	1.47E-06	2.70E-06
o,p'-DDT	0.00009	0.00024	0.381	365	30	1	70	25,550	10,950	2.10E-07	5.69E-07	4.90E-07	1.33E-06
p,p'-DDD	0.00165	0.00249	0.381	365	30	1	70	25,550	10,950	3.84E-06	5.82E-06	8.95E-06	1.36E-05
p,p'-DDE	0.00241	0.00449	0.381	365	30	1	70	25,550	10,950	5.61E-06	1.05E-05	1.31E-05	2.44E-05
p,p'-DDT	0.00063	0.00161	0.381	365	30	1	70	25,550	10,950	1.47E-06	3.75E-06	3.44E-06	8.76E-06
POLYAROMATIC HYDROCARBONS													
BENZO(A)ANTHRACENE	0.00592	0.01200	0.381	365	30	1	70	25,550	10,950	1.38E-05	2.80E-05	3.22E-05	6.53E-05
BENZO(A)PYRENE	0.00693	0.01200	0.381	365	30	1	70	25,550	10,950	1.62E-05	2.80E-05	3.77E-05	6.53E-05
BENZO(E)PYRENE	0.01504	0.02800	0.381	365	30	1	70	25,550	10,950	3.51E-05	6.53E-05	8.18E-05	1.52E-04
CHRYSENE	0.00914	0.01600	0.381	365	30	1	70	25,550	10,950	2.13E-05	3.73E-05	4.98E-05	8.71E-05
FLUORANTHENE	0.01168	0.01800	0.381	365	30	1	70	25,550	10,950	2.73E-05	4.20E-05	6.36E-05	9.80E-05
PERYLENE	0.00723	0.01100	0.381	365	30	1	70	25,550	10,950	1.69E-05	2.57E-05	3.94E-05	5.99E-05
PHENANTHRENE	0.00158	0.00418	0.381	365	30	1	70	25,550	10,950	3.69E-06	9.75E-06	8.62E-06	2.28E-05
PYRENE	0.01756	0.03500	0.381	365	30	1	70	25,550	10,950	4.10E-05	8.16E-05	9.56E-05	1.91E-04
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.00901	0.03629	0.381	365	30	1	70	25,550	10,950	2.10E-05	8.47E-05	4.90E-05	1.98E-04

TABLE 3-28

Consumption of Locally Caught Flounder Fillet
Recreational Exposures, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value
IR	=	.054 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-28
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	1.5911	2.6796	0.054	350	30	1	70	25,550	10,950	5.04E-04	8.50E-04	1.18E-03	1.98E-03
ARSENIC	1.4733	1.7500	0.054	350	30	1	70	25,550	10,950	4.67E-04	5.55E-04	1.09E-03	1.29E-03
CADMIUM	0.0045	0.0117	0.054	350	30	1	70	25,550	10,950	1.42E-06	3.71E-06	3.31E-06	8.65E-06
CHROMIUM	0.1852	0.3250	0.054	350	30	1	70	25,550	10,950	5.87E-05	1.03E-04	1.37E-04	2.40E-04
COPPER	0.2342	0.3510	0.054	350	30	1	70	25,550	10,950	7.42E-05	1.11E-04	1.73E-04	2.60E-04
IRON	3.9900	6.4300	0.054	350	30	1	70	25,550	10,950	1.26E-03	2.04E-03	2.95E-03	4.76E-03
LEAD	0.0388	0.0950	0.054	350	30	1	70	25,550	10,950	1.23E-05	3.01E-05	2.87E-05	7.03E-05
MANGANESE	0.2920	0.7750	0.054	350	30	1	70	25,550	10,950	9.26E-05	2.46E-04	2.16E-04	5.73E-04
MERCURY	0.0219	0.0351	0.054	350	30	1	70	25,550	10,950	6.94E-06	1.11E-05	1.62E-05	2.60E-05
NICKEL	0.1444	0.1766	0.054	350	30	1	70	25,550	10,950	4.58E-05	5.60E-05	1.07E-04	1.31E-04
SILVER	0.0059	0.0142	0.054	350	30	1	70	25,550	10,950	1.86E-06	4.50E-06	4.33E-06	1.05E-05
ZINC	7.5180	10.5250	0.054	350	30	1	70	25,550	10,950	2.38E-03	3.34E-03	5.56E-03	7.79E-03
PESTICIDES													
ALDRIN	0.00026	0.00060	0.054	350	30	1	70	25,550	10,950	8.33E-08	1.90E-07	1.94E-07	4.44E-07
ALPHA-CHLORDANE	0.00030	0.00085	0.054	350	30	1	70	25,550	10,950	9.62E-08	2.70E-07	2.25E-07	6.30E-07
HEPTACHLOR	0.00020	0.00060	0.054	350	30	1	70	25,550	10,950	6.34E-08	1.90E-07	1.48E-07	4.44E-07
HEPTACHLOR EPOXIDE	0.00017	0.00060	0.054	350	30	1	70	25,550	10,950	5.27E-08	1.90E-07	1.23E-07	4.44E-07
HEXACHLOROBENZENE	0.00074	0.00240	0.054	350	30	1	70	25,550	10,950	2.34E-07	7.61E-07	5.46E-07	1.78E-06
LINDANE (GAMMA-BHC)	0.00018	0.00060	0.054	350	30	1	70	25,550	10,950	5.65E-08	1.90E-07	1.32E-07	4.44E-07
MIREX	0.00020	0.00060	0.054	350	30	1	70	25,550	10,950	6.29E-08	1.90E-07	1.47E-07	4.44E-07
TRANS-NONACHLOR	0.00059	0.00133	0.054	350	30	1	70	25,550	10,950	1.88E-07	4.23E-07	4.38E-07	9.87E-07
o,p'-DDD	0.00027	0.00060	0.054	350	30	1	70	25,550	10,950	8.62E-08	1.90E-07	2.01E-07	4.44E-07
o,p'-DDE	0.00021	0.00060	0.054	350	30	1	70	25,550	10,950	6.72E-08	1.90E-07	1.57E-07	4.44E-07
o,p'-DDT	0.00041	0.00089	0.054	350	30	1	70	25,550	10,950	1.31E-07	2.82E-07	3.06E-07	6.57E-07
p,p'-DDD	0.00072	0.00276	0.054	350	30	1	70	25,550	10,950	2.29E-07	8.75E-07	5.35E-07	2.04E-06
p,p'-DDE	0.00299	0.00943	0.054	350	30	1	70	25,550	10,950	9.48E-07	2.99E-06	2.21E-06	6.98E-06
p,p'-DDT	0.00125	0.00531	0.054	350	30	1	70	25,550	10,950	3.97E-07	1.68E-06	9.26E-07	3.93E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.03371	0.07987	0.054	350	30	1	70	25,550	10,950	1.07E-05	2.53E-05	2.49E-05	5.91E-05

TABLE 3-29
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	0.9030	0.9030 *	0.054	350	30	1	70	25,550	10,950	2.86E-04	2.86E-04	6.68E-04	6.68E-04
ARSENIC	1.3300	1.3300 *	0.054	350	30	1	70	25,550	10,950	4.22E-04	4.22E-04	9.84E-04	9.84E-04
CHROMIUM	0.1204	0.1204 *	0.054	350	30	1	70	25,550	10,950	3.82E-05	3.82E-05	8.91E-05	8.91E-05
COPPER	0.1483	0.1483 *	0.054	350	30	1	70	25,550	10,950	4.70E-05	4.70E-05	1.10E-04	1.10E-04
IRON	2.0200	2.0200 *	0.054	350	30	1	70	25,550	10,950	6.40E-04	6.40E-04	1.49E-03	1.49E-03
LEAD	0.0110	0.0110 *	0.054	350	30	1	70	25,550	10,950	3.49E-06	3.49E-06	8.14E-06	8.14E-06
MANGANESE	0.0839	0.0839 *	0.054	350	30	1	70	25,550	10,950	2.66E-05	2.66E-05	6.21E-05	6.21E-05
MERCURY	0.0193	0.0193 *	0.054	350	30	1	70	25,550	10,950	6.12E-06	6.12E-06	1.43E-05	1.43E-05
NICKEL	0.1161	0.1161 *	0.054	350	30	1	70	25,550	10,950	3.68E-05	3.68E-05	8.59E-05	8.59E-05
SILVER	0.0086	0.0086 *	0.054	350	30	1	70	25,550	10,950	2.73E-06	2.73E-06	6.36E-06	6.36E-06
ZINC	5.2460	5.2460 *	0.054	350	30	1	70	25,550	10,950	1.66E-03	1.66E-03	3.88E-03	3.88E-03
PESTICIDES													
ALDRIN	0.00037	0.00058	0.054	350	30	1	70	25,550	10,950	1.17E-07	1.84E-07	2.73E-07	4.29E-07
ALPHA-CHLORDANE	0.00016	0.00016 *	0.054	350	30	1	70	25,550	10,950	4.92E-08	5.13E-08	1.15E-07	1.20E-07
HEPTACHLOR	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.71E-08	4.71E-08	1.10E-07	1.10E-07
HEPTACHLOR EPOXIDE	0.00003	0.00003 *	0.054	350	30	1	70	25,550	10,950	9.67E-09	1.10E-08	2.26E-08	2.57E-08
HEXACHLOROBENZENE	0.00013	0.00016	0.054	350	30	1	70	25,550	10,950	4.09E-08	5.03E-08	9.55E-08	1.17E-07
LINDANE (GAMMA-BHC)	0.00006	0.00007	0.054	350	30	1	70	25,550	10,950	1.98E-08	2.32E-08	4.62E-08	5.42E-08
MIREX	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.71E-08	4.71E-08	1.10E-07	1.10E-07
TRANS-NONACHLOR	0.00023	0.00031	0.054	350	30	1	70	25,550	10,950	7.34E-08	9.98E-08	1.71E-07	2.33E-07
o,p'-DDD	0.00015	0.00015 *	0.054	350	30	1	70	25,550	10,950	4.71E-08	4.71E-08	1.10E-07	1.10E-07
o,p'-DDE	0.00014	0.00015	0.054	350	30	1	70	25,550	10,950	4.46E-08	4.71E-08	1.04E-07	1.10E-07
o,p'-DDT	0.00052	0.00089	0.054	350	30	1	70	25,550	10,950	1.64E-07	2.82E-07	3.84E-07	6.57E-07
p,p'-DDD	0.00010	0.00015	0.054	350	30	1	70	25,550	10,950	3.20E-08	4.71E-08	7.47E-08	1.10E-07
p,p'-DDE	0.00067	0.00081	0.054	350	30	1	70	25,550	10,950	2.12E-07	2.57E-07	4.94E-07	6.00E-07
p,p'-DDT	0.00277	0.00531	0.054	350	30	1	70	25,550	10,950	8.78E-07	1.68E-06	2.05E-06	3.93E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01437	0.01845	0.054	350	30	1	70	25,550	10,950	4.55E-06	5.85E-06	1.06E-05	1.36E-05

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-30
CONSUMPTION OF FLOUNDER FILLET CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	1.0850	1.2500	0.054	350	30	1	70	25,550	10,950	3.44E-04	3.96E-04	8.03E-04	9.25E-04
ARSENIC	1.6850	1.7500	0.054	350	30	1	70	25,550	10,950	5.34E-04	5.55E-04	1.25E-03	1.29E-03
CHROMIUM	0.2365	0.3250	0.054	350	30	1	70	25,550	10,950	7.50E-05	1.03E-04	1.75E-04	2.40E-04
COPPER	0.2313	0.2425	0.054	350	30	1	70	25,550	10,950	7.33E-05	7.69E-05	1.71E-04	1.79E-04
IRON	2.8350	3.7700	0.054	350	30	1	70	25,550	10,950	8.99E-04	1.20E-03	2.10E-03	2.79E-03
LEAD	0.0555	0.0950	0.054	350	30	1	70	25,550	10,950	1.76E-05	3.01E-05	4.11E-05	7.03E-05
MANGANESE	0.4205	0.7750	0.054	350	30	1	70	25,550	10,950	1.33E-04	2.46E-04	3.11E-04	5.73E-04
MERCURY	0.0135	0.0220	0.054	350	30	1	70	25,550	10,950	4.28E-06	6.97E-06	9.99E-06	1.63E-05
NICKEL	0.1385	0.1520	0.054	350	30	1	70	25,550	10,950	4.39E-05	4.82E-05	1.02E-04	1.12E-04
ZINC	8.7125	10.5250	0.054	350	30	1	70	25,550	10,950	2.76E-03	3.34E-03	6.44E-03	7.79E-03
PESTICIDES (MG/KG)													
ALDRIN	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
ALPHA-CHLORDANE	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
HEPTACHLOR	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
HEPTACHLOR EPOXIDE	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
HEXACHLOROBENZENE	0.00160	0.00240	0.054	350	30	1	70	25,550	10,950	5.07E-07	7.61E-07	1.18E-06	1.78E-06
LINDANE (GAMMA-BHC)	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
MIREX	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
TRANS-NONACHLOR	0.00080	0.00110	0.054	350	30	1	70	25,550	10,950	2.54E-07	3.49E-07	5.92E-07	8.14E-07
o,p'-DDD	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
o,p'-DDE	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
o,p'-DDT	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
p,p'-DDD	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
p,p'-DDE	0.00350	0.00530	0.054	350	30	1	70	25,550	10,950	1.11E-06	1.68E-06	2.59E-06	3.92E-06
p,p'-DDT	0.00040	0.00060	0.054	350	30	1	70	25,550	10,950	1.27E-07	1.90E-07	2.96E-07	4.44E-07
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.04284	0.06245	0.054	350	30	1	70	25,550	10,950	1.36E-05	1.98E-05	3.17E-05	4.62E-05

TABLE 3-31
CONSUMPTION OF FLOUNDER FILLET CAUGHT FROM CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	2.1579	2.6796	0.054	350	30	1	70	25,550	10,950	6.84E-04	8.50E-04	1.60E-03	1.98E-03
ARSENIC	1.3800	1.6400	0.054	350	30	1	70	25,550	10,950	4.37E-04	5.20E-04	1.02E-03	1.21E-03
CADMIUM	0.0059	0.0117	0.054	350	30	1	70	25,550	10,950	1.88E-06	3.71E-06	4.38E-06	8.65E-06
CHROMIUM	0.1725	0.2574	0.054	350	30	1	70	25,550	10,950	5.47E-05	8.16E-05	1.28E-04	1.90E-04
COPPER	0.2648	0.3510	0.054	350	30	1	70	25,550	10,950	8.39E-05	1.11E-04	1.96E-04	2.60E-04
IRON	5.4167	6.4300	0.054	350	30	1	70	25,550	10,950	1.72E-03	2.04E-03	4.01E-03	4.76E-03
LEAD	0.0370	0.0490	0.054	350	30	1	70	25,550	10,950	1.17E-05	1.55E-05	2.74E-05	3.62E-05
MANGANESE	0.2758	0.5850	0.054	350	30	1	70	25,550	10,950	8.74E-05	1.85E-04	2.04E-04	4.33E-04
MERCURY	0.0316	0.0351	0.054	350	30	1	70	25,550	10,950	1.00E-05	1.11E-05	2.33E-05	2.60E-05
NICKEL	0.1578	0.1766	0.054	350	30	1	70	25,550	10,950	5.00E-05	5.60E-05	1.17E-04	1.31E-04
SILVER	0.0065	0.0142	0.054	350	30	1	70	25,550	10,950	2.07E-06	4.50E-06	4.82E-06	1.05E-05
ZINC	7.4790	9.6170	0.054	350	30	1	70	25,550	10,950	2.37E-03	3.05E-03	5.53E-03	7.11E-03
PESTICIDES													
ALDRIN	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.82E-08	4.76E-08	8.92E-08	1.11E-07
ALPHA-CHLORDANE	0.00036	0.00085	0.054	350	30	1	70	25,550	10,950	1.14E-07	2.70E-07	2.65E-07	6.30E-07
HEPTACHLOR	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.82E-08	4.76E-08	8.92E-08	1.11E-07
HEPTACHLOR EPOXIDE	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.82E-08	4.76E-08	8.92E-08	1.11E-07
HEXACHLOROBENZENE	0.00055	0.00117	0.054	350	30	1	70	25,550	10,950	1.76E-07	3.72E-07	4.10E-07	8.68E-07
LINDANE (GAMMA-BHC)	0.00010	0.00014	0.054	350	30	1	70	25,550	10,950	3.24E-08	4.37E-08	7.56E-08	1.02E-07
MIREX	0.00012	0.00015	0.054	350	30	1	70	25,550	10,950	3.71E-08	4.76E-08	8.66E-08	1.11E-07
TRANS-NONACHLOR	0.00072	0.00133	0.054	350	30	1	70	25,550	10,950	2.29E-07	4.23E-07	5.34E-07	9.87E-07
o,p'-DDD	0.00030	0.00046	0.054	350	30	1	70	25,550	10,950	9.42E-08	1.45E-07	2.20E-07	3.37E-07
o,p'-DDE	0.00015	0.00031	0.054	350	30	1	70	25,550	10,950	4.90E-08	9.76E-08	1.14E-07	2.28E-07
o,p'-DDT	0.00037	0.00083	0.054	350	30	1	70	25,550	10,950	1.18E-07	2.63E-07	2.75E-07	6.13E-07
p,p'-DDD	0.00137	0.00276	0.054	350	30	1	70	25,550	10,950	4.35E-07	8.75E-07	1.02E-06	2.04E-06
p,p'-DDE	0.00419	0.00943	0.054	350	30	1	70	25,550	10,950	1.33E-06	2.99E-06	3.10E-06	6.98E-06
p,p'-DDT	0.00056	0.00080	0.054	350	30	1	70	25,550	10,950	1.78E-07	2.55E-07	4.16E-07	5.94E-07
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.04052	0.07987	0.054	350	30	1	70	25,550	10,950	1.28E-05	2.53E-05	3.00E-05	5.91E-05

TABLE 3-32
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
PESTICIDES													
ALPHA-CHLORDANE	0.00039	0.00039	0.054	350	30	1	70	25,550	10,950	1.24E-07	1.24E-07	2.88E-07	2.88E-07
TRANS-NONACHLOR	0.00019	0.00019	0.054	350	30	1	70	25,550	10,950	6.02E-08	6.02E-08	1.41E-07	1.41E-07
p,p'-DDD	0.00035	0.00035	0.054	350	30	1	70	25,550	10,950	1.11E-07	1.11E-07	2.59E-07	2.59E-07
p,p'-DDE	0.00079	0.00079	0.054	350	30	1	70	25,550	10,950	2.50E-07	2.50E-07	5.84E-07	5.84E-07
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01352	0.01414	0.054	350	30	1	70	25,550	10,950	4.29E-06	4.48E-06	1.00E-05	1.05E-05

TABLE 3-33

Consumption of Locally Caught Flounder Fillet For Subsistence Fishing
Residential Exposures, Off-Site, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CF \times IR \times FI \times EF \times ED}{BW \times AT}$$

CF	=	Contaminant concentration in fish (mg/kg)
IR	=	Ingestion Rate (kg/day)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CF	=	Site-specific measured or modeled value
IR	=	0.132 kg/day (USEPA 1991)
FI	=	1.0 (Assumed)
EF	=	350 days/year subsistence (USEPA 1991)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December 1989a)

TABLE 3-33

CONSUMPTION OF FLOUNDER FILLET CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING

RESIDENTIAL EXPOSURES, OFF-SITE, OFF-SHORE IMPACTS

CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES

PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAXI-MUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAM-INATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	1.5911	2.6796	0.132	350	30	1	70	25,550	10,950	1.23E-03	2.08E-03	2.88E-03	4.85E-03
ARSENIC	1.4733	1.7500	0.132	350	30	1	70	25,550	10,950	1.14E-03	1.36E-03	2.66E-03	3.16E-03
CADMIUM	0.0045	0.0117	0.132	350	30	1	70	25,550	10,950	3.47E-06	9.07E-06	8.09E-06	2.12E-05
CHROMIUM	0.1852	0.3250	0.132	350	30	1	70	25,550	10,950	1.43E-04	2.52E-04	3.35E-04	5.88E-04
COPPER	0.2342	0.3510	0.132	350	30	1	70	25,550	10,950	1.81E-04	2.72E-04	4.23E-04	6.35E-04
IRON	3.9900	6.4300	0.132	350	30	1	70	25,550	10,950	3.09E-03	4.98E-03	7.21E-03	1.16E-02
LEAD	0.0388	0.0950	0.132	350	30	1	70	25,550	10,950	3.01E-05	7.36E-05	7.02E-05	1.72E-04
MANGANESE	0.2920	0.7750	0.132	350	30	1	70	25,550	10,950	2.26E-04	6.01E-04	5.28E-04	1.40E-03
MERCURY	0.0219	0.0351	0.132	350	30	1	70	25,550	10,950	1.70E-05	2.72E-05	3.96E-05	6.35E-05
NICKEL	0.1444	0.1766	0.132	350	30	1	70	25,550	10,950	1.12E-04	1.37E-04	2.61E-04	3.19E-04
SILVER	0.0059	0.0142	0.132	350	30	1	70	25,550	10,950	4.54E-06	1.10E-05	1.06E-05	2.57E-05
ZINC	7.5180	10.5250	0.132	350	30	1	70	25,550	10,950	5.83E-03	8.16E-03	1.36E-02	1.90E-02
PESTICIDES													
ALDRIN	0.00026	0.00060	0.132	350	30	1	70	25,550	10,950	2.04E-07	4.65E-07	4.75E-07	1.08E-06
ALPHA-CHLORDANE	0.00030	0.00085	0.132	350	30	1	70	25,550	10,950	2.35E-07	6.59E-07	5.49E-07	1.54E-06
HEPTACHLOR	0.00020	0.00060	0.132	350	30	1	70	25,550	10,950	1.55E-07	4.65E-07	3.61E-07	1.08E-06
HEPTACHLOR EPOXIDE	0.00017	0.00060	0.132	350	30	1	70	25,550	10,950	1.29E-07	4.65E-07	3.00E-07	1.08E-06
HEXACHLOROBENZENE	0.00074	0.00240	0.132	350	30	1	70	25,550	10,950	5.71E-07	1.86E-06	1.33E-06	4.34E-06
LINDANE (GAMMA-BHC)	0.00018	0.00060	0.132	350	30	1	70	25,550	10,950	1.38E-07	4.65E-07	3.22E-07	1.08E-06
MIREX	0.00020	0.00060	0.132	350	30	1	70	25,550	10,950	1.54E-07	4.65E-07	3.59E-07	1.08E-06
TRANS-NONACHLOR	0.00059	0.00133	0.132	350	30	1	70	25,550	10,950	4.59E-07	1.03E-06	1.07E-06	2.41E-06
o,p'-DDD	0.00027	0.00060	0.132	350	30	1	70	25,550	10,950	2.11E-07	4.65E-07	4.92E-07	1.08E-06
o,p'-DDE	0.00021	0.00060	0.132	350	30	1	70	25,550	10,950	1.64E-07	4.65E-07	3.84E-07	1.08E-06
o,p'-DDT	0.00041	0.00089	0.132	350	30	1	70	25,550	10,950	3.20E-07	6.88E-07	7.47E-07	1.61E-06
p,p'-DDD	0.00072	0.00276	0.132	350	30	1	70	25,550	10,950	5.60E-07	2.14E-06	1.31E-06	4.99E-06
p,p'-DDE	0.00299	0.00943	0.132	350	30	1	70	25,550	10,950	2.32E-06	7.31E-06	5.41E-06	1.71E-05
p,p'-DDT	0.00125	0.00531	0.132	350	30	1	70	25,550	10,950	9.70E-07	4.11E-06	2.26E-06	9.60E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.03371	0.07987	0.132	350	30	1	70	25,550	10,950	2.61E-05	6.19E-05	6.10E-05	1.44E-04

TABLE 3-34
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	0.9030	0.9030 *	0.381	365	30	1	70	25,550	10,950	2.11E-03	2.11E-03	4.91E-03	4.91E-03
ARSENIC	1.3300	1.3300 *	0.381	365	30	1	70	25,550	10,950	3.10E-03	3.10E-03	7.24E-03	7.24E-03
CHROMIUM	0.1204	0.1204 *	0.381	365	30	1	70	25,550	10,950	2.81E-04	2.81E-04	6.55E-04	6.55E-04
COPPER	0.1483	0.1483 *	0.381	365	30	1	70	25,550	10,950	3.46E-04	3.46E-04	8.07E-04	8.07E-04
IRON	2.0200	2.0200 *	0.381	365	30	1	70	25,550	10,950	4.71E-03	4.71E-03	1.10E-02	1.10E-02
LEAD	0.0110	0.0110 *	0.381	365	30	1	70	25,550	10,950	2.57E-05	2.57E-05	5.99E-05	5.99E-05
MANGANESE	0.0839	0.0839 *	0.381	365	30	1	70	25,550	10,950	1.96E-04	1.96E-04	4.57E-04	4.57E-04
MERCURY	0.0193	0.0193 *	0.381	365	30	1	70	25,550	10,950	4.50E-05	4.50E-05	1.05E-04	1.05E-04
NICKEL	0.1161	0.1161 *	0.381	365	30	1	70	25,550	10,950	2.71E-04	2.71E-04	6.32E-04	6.32E-04
SILVER	0.0086	0.0086 *	0.381	365	30	1	70	25,550	10,950	2.01E-05	2.01E-05	4.68E-05	4.68E-05
ZINC	5.2460	5.2460 *	0.381	365	30	1	70	25,550	10,950	1.22E-02	1.22E-02	2.86E-02	2.86E-02
PESTICIDES													
ALDRIN	0.00037	0.00058	0.381	365	30	1	70	25,550	10,950	8.60E-07	1.35E-06	2.01E-06	3.16E-06
ALPHA-CHLORDANE	0.00016	0.00016 *	0.381	365	30	1	70	25,550	10,950	3.62E-07	3.77E-07	8.44E-07	8.80E-07
HEPTACHLOR	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.46E-07	3.46E-07	8.08E-07	8.08E-07
HEPTACHLOR EPOXIDE	0.00003	0.00003 *	0.381	365	30	1	70	25,550	10,950	7.11E-08	8.12E-08	1.66E-07	1.89E-07
HEXACHLOROBENZENE	0.00013	0.00016	0.381	365	30	1	70	25,550	10,950	3.01E-07	3.70E-07	7.03E-07	8.64E-07
LINDANE (GAMMA-BHC)	0.00006	0.00007	0.381	365	30	1	70	25,550	10,950	1.46E-07	1.71E-07	3.40E-07	3.99E-07
MIREX	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.46E-07	3.46E-07	8.08E-07	8.08E-07
TRANS-NONACHLOR	0.00023	0.00031	0.381	365	30	1	70	25,550	10,950	5.40E-07	7.34E-07	1.26E-06	1.71E-06
o,p'-DDD	0.00015	0.00015 *	0.381	365	30	1	70	25,550	10,950	3.46E-07	3.46E-07	8.08E-07	8.08E-07
o,p'-DDE	0.00014	0.00015	0.381	365	30	1	70	25,550	10,950	3.28E-07	3.46E-07	7.65E-07	8.08E-07
o,p'-DDT	0.00052	0.00089	0.381	365	30	1	70	25,550	10,950	1.21E-06	2.07E-06	2.82E-06	4.84E-06
p,p'-DDD	0.00010	0.00015	0.381	365	30	1	70	25,550	10,950	2.36E-07	3.46E-07	5.50E-07	8.08E-07
p,p'-DDE	0.00067	0.00081	0.381	365	30	1	70	25,550	10,950	1.56E-06	1.89E-06	3.63E-06	4.41E-06
p,p'-DDT	0.00277	0.00531	0.381	365	30	1	70	25,550	10,950	6.46E-06	1.24E-05	1.51E-05	2.89E-05
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01437	0.01845	0.381	365	30	1	70	25,550	10,950	3.35E-05	4.30E-05	7.82E-05	1.00E-04

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-35
CONSUMPTION OF FLOUNDER FILLET CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFFSHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	1.0850	1.2500	0.381	365	30	1	70	25,550	10,950	2.53E-03	2.92E-03	5.91E-03	6.80E-03
ARSENIC	1.6850	1.7500	0.381	365	30	1	70	25,550	10,950	3.93E-03	4.08E-03	9.17E-03	9.53E-03
CHROMIUM	0.2365	0.3250	0.381	365	30	1	70	25,550	10,950	5.52E-04	7.58E-04	1.29E-03	1.77E-03
COPPER	0.2313	0.2425	0.381	365	30	1	70	25,550	10,950	5.40E-04	5.66E-04	1.26E-03	1.32E-03
IRON	2.8350	3.7700	0.381	365	30	1	70	25,550	10,950	6.61E-03	8.79E-03	1.54E-02	2.05E-02
LEAD	0.0555	0.0950	0.381	365	30	1	70	25,550	10,950	1.29E-04	2.22E-04	3.02E-04	5.17E-04
MANGANESE	0.4205	0.7750	0.381	365	30	1	70	25,550	10,950	9.81E-04	1.81E-03	2.29E-03	4.22E-03
MERCURY	0.0135	0.0220	0.381	365	30	1	70	25,550	10,950	3.15E-05	5.13E-05	7.35E-05	1.20E-04
NICKEL	0.1385	0.1520	0.381	365	30	1	70	25,550	10,950	3.23E-04	3.55E-04	7.54E-04	8.27E-04
ZINC	8.7125	10.5250	0.381	365	30	1	70	25,550	10,950	2.03E-02	2.46E-02	4.74E-02	5.73E-02
PESTICIDES													
ALDRIN	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
ALPHA-CHLORDANE	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
HEPTACHLOR	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
HEPTACHLOR EPOXIDE	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
HEXACHLOROBENZENE	0.00160	0.00240	0.381	365	30	1	70	25,550	10,950	3.73E-06	5.60E-06	8.71E-06	1.31E-05
LINDANE (GAMMA-BHC)	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
MIREX	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
TRANS-NONACHLOR	0.00080	0.00110	0.381	365	30	1	70	25,550	10,950	1.87E-06	2.57E-06	4.35E-06	5.99E-06
o,p'-DDD	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
o,p'-DDE	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
o,p'-DDT	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
p,p'-DDD	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
p,p'-DDE	0.00350	0.00530	0.381	365	30	1	70	25,550	10,950	8.16E-06	1.24E-05	1.91E-05	2.88E-05
p,p'-DDT	0.00040	0.00060	0.381	365	30	1	70	25,550	10,950	9.33E-07	1.40E-06	2.18E-06	3.27E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.04284	0.06245	0.381	365	30	1	70	25,550	10,950	9.99E-05	1.46E-04	2.33E-04	3.40E-04

TABLE 3-36
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	2.1579	2.6796	0.381	365	30	1	70	25,550	10,950	5.03E-03	6.25E-03	1.17E-02	1.46E-02
ARSENIC	1.3800	1.6400	0.381	365	30	1	70	25,550	10,950	3.22E-03	3.83E-03	7.51E-03	8.93E-03
CADMIUM	0.0059	0.0117	0.381	365	30	1	70	25,550	10,950	1.38E-05	2.73E-05	3.22E-05	6.37E-05
CHROMIUM	0.1725	0.2574	0.381	365	30	1	70	25,550	10,950	4.02E-04	6.00E-04	9.39E-04	1.40E-03
COPPER	0.2648	0.3510	0.381	365	30	1	70	25,550	10,950	6.18E-04	8.19E-04	1.44E-03	1.91E-03
IRON	5.4167	6.4300	0.381	365	30	1	70	25,550	10,950	1.26E-02	1.50E-02	2.95E-02	3.50E-02
LEAD	0.0370	0.0490	0.381	365	30	1	70	25,550	10,950	8.63E-05	1.14E-04	2.01E-04	2.67E-04
MANGANESE	0.2758	0.5850	0.381	365	30	1	70	25,550	10,950	6.43E-04	1.36E-03	1.50E-03	3.18E-03
MERCURY	0.0316	0.0351	0.381	365	30	1	70	25,550	10,950	7.36E-05	8.19E-05	1.72E-04	1.91E-04
NICKEL	0.1578	0.1766	0.381	365	30	1	70	25,550	10,950	3.68E-04	4.12E-04	8.59E-04	9.61E-04
SILVER	0.0065	0.0142	0.381	365	30	1	70	25,550	10,950	1.52E-05	3.31E-05	3.55E-05	7.73E-05
ZINC	7.4790	9.6170	0.381	365	30	1	70	25,550	10,950	1.74E-02	2.24E-02	4.07E-02	5.23E-02
PESTICIDES													
ALDRIN	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.81E-07	3.50E-07	6.57E-07	8.16E-07
ALPHA-CHLORDANE	0.00036	0.00085	0.381	365	30	1	70	25,550	10,950	8.36E-07	1.99E-06	1.95E-06	4.63E-06
HEPTACHLOR	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.81E-07	3.50E-07	6.57E-07	8.16E-07
HEPTACHLOR EPOXIDE	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.81E-07	3.50E-07	6.57E-07	8.16E-07
HEXACHLOROBENZENE	0.00055	0.00117	0.381	365	30	1	70	25,550	10,950	1.29E-06	2.74E-06	3.02E-06	6.38E-06
LINDANE (GAMMA-BHC)	0.00010	0.00014	0.381	365	30	1	70	25,550	10,950	2.38E-07	3.22E-07	5.56E-07	7.51E-07
MIREX	0.00012	0.00015	0.381	365	30	1	70	25,550	10,950	2.73E-07	3.50E-07	6.38E-07	8.16E-07
TRANS-NONACHLOR	0.00072	0.00133	0.381	365	30	1	70	25,550	10,950	1.68E-06	3.11E-06	3.93E-06	7.26E-06
o,p'-DDD	0.00030	0.00046	0.381	365	30	1	70	25,550	10,950	6.93E-07	1.06E-06	1.62E-06	2.48E-06
o,p'-DDE	0.00015	0.00031	0.381	365	30	1	70	25,550	10,950	3.60E-07	7.18E-07	8.41E-07	1.68E-06
o,p'-DDT	0.00037	0.00083	0.381	365	30	1	70	25,550	10,950	8.68E-07	1.93E-06	2.03E-06	4.51E-06
p,p'-DDD	0.00137	0.00276	0.381	365	30	1	70	25,550	10,950	3.20E-06	6.44E-06	7.47E-06	1.50E-05
p,p'-DDE	0.00419	0.00943	0.381	365	30	1	70	25,550	10,950	9.77E-06	2.20E-05	2.28E-05	5.13E-05
p,p'-DDT	0.00056	0.00080	0.381	365	30	1	70	25,550	10,950	1.31E-06	1.87E-06	3.06E-06	4.37E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.04052	0.07987	0.381	365	30	1	70	25,550	10,950	9.45E-05	1.86E-04	2.21E-04	4.35E-04

TABLE 3-37
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SITE, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INTAKE RATE (kg/day)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (years)	FRACTION INGESTED FROM CONTAMINATED SOURCE	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
PESTICIDES													
ALPHA-CHLORDANE	0.00039	0.00039 *	0.381	365	30	1	70	25,550	10,950	9.10E-07	9.10E-07	2.12E-06	2.12E-06
TRANS-NONACHLOR	0.00019	0.00019 *	0.381	365	30	1	70	25,550	10,950	4.43E-07	4.43E-07	1.03E-06	1.03E-06
p,p'-DDD	0.00035	0.00035 *	0.381	365	30	1	70	25,550	10,950	8.16E-07	8.16E-07	1.91E-06	1.91E-06
p,p'-DDE	0.00079	0.00079 *	0.381	365	30	1	70	25,550	10,950	1.84E-06	1.84E-06	4.30E-06	4.30E-06
POLYCHLORINATED BIPHENYLS (PCBs)													
TOTAL PCBs (AROCHLOR)	0.01352	0.01414 *	0.381	365	30	1	70	25,550	10,950	3.15E-05	3.30E-05	7.36E-05	7.70E-05

NOTES:

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 3-38

Ingestion of Chemicals in Sediment For Current Conditions
Recreational Exposures, While Swimming, Fishing and Wading in River, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

Intake (mg/kg - day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

CS	=	Chemical concentration in sediment (mg/kg)
IR	=	Ingestion Rate Sediment (mg/day)
CF	=	Conversion Factor (10^{-6} mg/kg)
FI	=	Fraction Ingested from contaminated source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CS	=	Site-specific measure value
IR	=	100 mg/day (USEPA, December, 1989a - uses soil ingestion rates for adults)
CF	=	10^{-6} mg/kg
FI	=	1.0 (Assumed)
EF	=	7 days/year (National average for swimming; USDOI in EPA 1988b, EPA 1989a)
ED	=	30 years (USEPA 1991)
BW	=	70 kg adult (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December, 1989a)

TABLE 3-38
INGESTION OF CHEMICALS IN SEDIMENT COLLECTED FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS														
ALUMINUM	33,647.6190	77,900.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	3.95E-04	9.15E-04	9.22E-04	2.13E-03
ARSENIC	12.2976	28.7000	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.44E-07	3.37E-07	3.37E-07	7.86E-07
CADMIUM	0.5794	2.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	6.80E-09	2.35E-08	1.59E-08	5.48E-08
CHROMIUM	109.0119	211.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.28E-06	2.48E-06	2.99E-06	5.78E-06
COPPER	43.2651	105.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	5.08E-07	1.23E-06	1.19E-06	2.88E-06
IRON	24,632.3810	50,300.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	2.89E-04	5.91E-04	6.75E-04	1.38E-03
LEAD	63.3348	124.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	7.44E-07	1.46E-06	1.74E-06	3.40E-06
MANGANESE	305.1905	542.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	3.58E-06	6.36E-06	8.36E-06	1.48E-05
MERCURY	0.2250	0.6700	100	1.00	1.00E-06	7	30	70	25,550	10,950	2.64E-09	7.87E-09	6.16E-09	1.84E-08
NICKEL	27.9049	91.2000	100	1.00	1.00E-06	7	30	70	25,550	10,950	3.28E-07	1.07E-06	7.65E-07	2.50E-06
SILVER	0.5926	1.3000	100	1.00	1.00E-06	7	30	70	25,550	10,950	6.96E-09	1.53E-08	1.62E-08	3.56E-08
ZINC	126.4357	530.0000	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.48E-06	6.22E-06	3.46E-06	1.45E-05
PESTICIDES														
ALDRIN	0.00168	0.02240	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.97E-11	2.63E-10	4.59E-11	6.14E-10
ALPHA-CHLORDANE	0.00069	0.00292	100	1.00	1.00E-06	7	30	70	25,550	10,950	8.05E-12	3.43E-11	1.88E-11	8.00E-11
HEXACHLOROBENZENE	0.00060	0.00720	100	1.00	1.00E-06	7	30	70	25,550	10,950	7.07E-12	8.45E-11	1.65E-11	1.97E-10
LINDANE (GAMMA-BHC)	0.00041	0.00106	100	1.00	1.00E-06	7	30	70	25,550	10,950	4.77E-12	1.25E-11	1.11E-11	2.92E-11
MIREX	0.00045	0.00170	100	1.00	1.00E-06	7	30	70	25,550	10,950	5.24E-12	2.00E-11	1.22E-11	4.66E-11
TRANS-NONACHLOR	0.00039	0.00148	100	1.00	1.00E-06	7	30	70	25,550	10,950	4.57E-12	1.73E-11	1.07E-11	4.04E-11
o,p'-DDD	0.00116	0.00372	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.36E-11	4.36E-11	3.17E-11	1.02E-10
o,p'-DDE	0.00075	0.00223	100	1.00	1.00E-06	7	30	70	25,550	10,950	8.78E-12	2.62E-11	2.05E-11	6.11E-11
o,p'-DDT	0.00104	0.00950	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.22E-11	1.12E-10	2.84E-11	2.60E-10
p,p'-DDD	0.00439	0.01908	100	1.00	1.00E-06	7	30	70	25,550	10,950	5.16E-11	2.24E-10	1.20E-10	5.23E-10
p,p'-DDE	0.00232	0.00640	100	1.00	1.00E-06	7	30	70	25,550	10,950	2.72E-11	7.51E-11	6.34E-11	1.75E-10
p,p'-DDT	0.01265	0.11956	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.48E-10	1.40E-09	3.46E-10	3.28E-09

TABLE 3-38
INGESTION OF CHEMICALS IN SEDIMENT COLLECTED FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
POLYAROMATIC HYDROCARBONS														
ANTHRACENE	0.24125	1.90000	100	1.00	1.00E-06	7	30	70	25,550	10,950	2.83E-09	2.23E-08	6.61E-09	5.21E-08
BENZO(A)ANTHRACENE	0.48149	3.60000	100	1.00	1.00E-06	7	30	70	25,550	10,950	5.65E-09	4.23E-08	1.32E-08	9.86E-08
BENZO(A)PYRENE	0.48184	2.30000	100	1.00	1.00E-06	7	30	70	25,550	10,950	5.66E-09	2.70E-08	1.32E-08	6.30E-08
BENZO(E)PYRENE	0.35043	1.50000	100	1.00	1.00E-06	7	30	70	25,550	10,950	4.11E-09	1.76E-08	9.60E-09	4.11E-08
BENZO(G,H,I)PERYLENE	0.19474	0.66000	100	1.00	1.00E-06	7	30	70	25,550	10,950	2.29E-09	7.75E-09	5.34E-09	1.81E-08
CHRYSENE	0.48643	3.20000	100	1.00	1.00E-06	7	30	70	25,550	10,950	5.71E-09	3.76E-08	1.33E-08	8.77E-08
DIBENZO(A,H)ANTHRACENE	0.05709	0.24000	100	1.00	1.00E-06	7	30	70	25,550	10,950	6.70E-10	2.82E-09	1.56E-09	6.58E-09
FLUORANTHENE	1.14012	14.00000	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.34E-08	1.64E-07	3.12E-08	3.84E-07
FLUORENE	0.07658	1.10000	100	1.00	1.00E-06	7	30	70	25,550	10,950	8.99E-10	1.29E-08	2.10E-09	3.01E-08
INDENO(1,2,3-CD)PYRENE	0.21539	0.95000	100	1.00	1.00E-06	7	30	70	25,550	10,950	2.53E-09	1.12E-08	5.90E-09	2.60E-08
PERYLENE	0.15622	0.86000	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.83E-09	1.01E-08	4.28E-09	2.36E-08
PHENANTHRENE	0.62655	6.20000	100	1.00	1.00E-06	7	30	70	25,550	10,950	7.36E-09	7.28E-08	1.72E-08	1.70E-07
PYRENE	0.97780	10.00000	100	1.00	1.00E-06	7	30	70	25,550	10,950	1.15E-08	1.17E-07	2.68E-08	2.74E-07
POLYCHLORINATED BIPHENYLS (PCBs)														
TOTAL PCBs (AROCHLOR)	0.06702	0.34770	100	1.00	1.00E-06	7	30	70	25,550	10,950	7.87E-10	4.08E-09	1.84E-09	9.53E-09

TABLE 3-39
INGESTION OF CHEMICALS IN SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS														
ALUMINUM	28,050.0000	31,700.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.74E-04	3.10E-04	7.68E-04	8.68E-04
ARSENIC	6.0500	13.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.92E-08	1.27E-07	1.66E-07	3.56E-07
CADMIUM	0.2000	0.2700	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.96E-09	2.64E-09	5.48E-09	7.40E-09
CHROMIUM	58.2500	99.8000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.70E-07	9.77E-07	1.60E-06	2.73E-06
COPPER	8.0300	22.4000	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.86E-08	2.19E-07	2.20E-07	6.14E-07
IRON	14,152.5000	22,800.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.38E-04	2.23E-04	3.88E-04	6.25E-04
LEAD	27.2900	61.9000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.67E-07	6.06E-07	7.48E-07	1.70E-06
MANGANESE	209.5000	306.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.05E-06	2.99E-06	5.74E-06	8.38E-06
NICKEL	13.7250	21.7000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.34E-07	2.12E-07	3.76E-07	5.95E-07
SILVER	0.4083	0.8900	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.00E-09	8.71E-09	1.12E-08	2.44E-08
ZINC	49.5000	82.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.84E-07	8.02E-07	1.36E-06	2.25E-06
PESTICIDES														
ALDRIN	0.00035	0.00068	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.44E-12	6.69E-12	9.64E-12	1.87E-11
ALPHA-CHLORDANE	0.00062	0.00098	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.04E-12	9.60E-12	1.69E-11	2.69E-11
o,p'-DDD	0.00055	0.00082	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.35E-12	8.00E-12	1.50E-11	2.24E-11
o,p'-DDE	0.00022	0.00031	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.18E-12	3.00E-12	6.11E-12	8.41E-12
p,p'-DDD	0.00126	0.00349	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.23E-11	3.41E-11	3.44E-11	9.55E-11
p,p'-DDE	0.00074	0.00219	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.20E-12	2.15E-11	2.02E-11	6.01E-11
p,p'-DDT	0.00706	0.01179	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.90E-11	1.15E-10	1.93E-10	3.23E-10
POLYAROMATIC HYDROCARBONS														
ANTHRACENE	0.19420	0.40000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.90E-09	3.91E-09	5.32E-09	1.10E-08
BENZO(A)ANTHRACENE	0.35460	0.68000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.47E-09	6.65E-09	9.72E-09	1.86E-08
BENZO(A)PYRENE	0.37600	0.70000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.68E-09	6.85E-09	1.03E-08	1.92E-08
BENZO(E)PYRENE	0.24220	0.48000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.37E-09	4.70E-09	6.64E-09	1.32E-08
BENZO(G,H,I)PERYLENE	0.14460	0.29000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.41E-09	2.84E-09	3.96E-09	7.95E-09
CHRYSENE	0.33700	0.63000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.30E-09	6.16E-09	9.23E-09	1.73E-08
DIBENZO(A,H)ANTHRACENE	0.05670	0.12000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.55E-10	1.17E-09	1.55E-09	3.29E-09
FLUORANTHENE	0.66120	1.20000	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.47E-09	1.17E-08	1.81E-08	3.29E-08
FLUORENE	0.03820	0.08200	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.74E-10	8.02E-10	1.05E-09	2.25E-09
INDENO(1,2,3-CD)PYRENE	0.18460	0.38000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.81E-09	3.72E-09	5.06E-09	1.04E-08
PERYLENE	0.10280	0.20000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.01E-09	1.96E-09	2.82E-09	5.48E-09
PHENANTHRENE	0.34620	0.64000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.39E-09	6.26E-09	9.48E-09	1.75E-08
PYRENE	0.60440	1.10000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.91E-09	1.08E-08	1.66E-08	3.01E-08
POLYCHLORINATED BIPHENYLS (PCBs)														
TOTAL PCBs (AROCHLOR)	0.05452	0.13360	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.33E-10	1.31E-09	1.49E-09	3.66E-09

TABLE 3-40
INGESTION OF CHEMICALS IN SEDIMENT FROM AROUND SEAVEY ISLAND FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day)			
									CARCINOGENS	NONCARCINOGENS	CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS														
ALUMINUM	32,635.0000	48,800.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.19E-04	4.77E-04	8.94E-04	1.34E-03
ARSENIC	10.9700	17.8000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.07E-07	1.74E-07	3.01E-07	4.88E-07
CADMIUM	0.5333	2.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.22E-09	1.96E-08	1.46E-08	5.48E-08
CHROMIUM	88.1800	151.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	8.63E-07	1.48E-06	2.42E-06	4.14E-06
COPPER	47.1150	105.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.61E-07	1.03E-06	1.29E-06	2.88E-06
IRON	23,610.0000	50,300.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.31E-04	4.92E-04	6.47E-04	1.38E-03
LEAD	70.7900	124.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.93E-07	1.21E-06	1.94E-06	3.40E-06
MANGANESE	308.7500	421.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.02E-06	4.12E-06	8.46E-06	1.15E-05
MERCURY	0.2142	0.6700	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.10E-09	6.56E-09	5.87E-09	1.84E-08
NICKEL	28.0526	91.2000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.74E-07	8.92E-07	7.69E-07	2.50E-06
SILVER	0.4610	0.7400	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.51E-09	7.24E-09	1.26E-08	2.03E-08
ZINC	139.2550	530.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.36E-06	5.19E-06	3.82E-06	1.45E-05
PESTICIDES														
ALDRIN	0.00280	0.02240	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.73E-11	2.19E-10	7.66E-11	6.14E-10
ALPHA-CHLORDANE	0.00068	0.00292	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.65E-12	2.86E-11	1.86E-11	8.00E-11
HEXACHLOROBENZENE	0.00033	0.00086	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.25E-12	8.43E-12	9.10E-12	2.36E-11
LINDANE (GAMMA-BHC)	0.00046	0.00106	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.49E-12	1.04E-11	1.26E-11	2.92E-11
MIREX	0.00039	0.00120	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.79E-12	1.17E-11	1.06E-11	3.29E-11
TRANS-NONACHLOR	0.00034	0.00148	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.34E-12	1.44E-11	9.34E-12	4.04E-11
o,p'-DDD	0.00080	0.00372	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.81E-12	3.64E-11	2.19E-11	1.02E-10
o,p'-DDE	0.00058	0.00223	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.70E-12	2.18E-11	1.60E-11	6.11E-11
o,p'-DDT	0.00114	0.00950	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.12E-11	9.30E-11	3.12E-11	2.60E-10
p,p'-DDD	0.00303	0.01908	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.96E-11	1.87E-10	8.29E-11	5.23E-10
p,p'-DDE	0.00186	0.00539	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.82E-11	5.27E-11	5.08E-11	1.48E-10
p,p'-DDT	0.01876	0.11956	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.84E-10	1.17E-09	5.14E-10	3.28E-09

TABLE 3-40
INGESTION OF CHEMICALS IN SEDIMENT FROM AROUND SEAVEY ISLAND FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsl (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
POLYAROMATIC HYDROCARBONS														
ANTHRACENE	0.32050	1.90000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.14E-09	1.86E-08	8.78E-09	5.21E-08
BENZO(A)ANTHRACENE	0.61083	3.60000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.98E-09	3.52E-08	1.67E-08	9.86E-08
BENZO(A)PYRENE	0.56125	2.20000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.49E-09	2.15E-08	1.54E-08	6.03E-08
BENZO(E)PYRENE	0.40750	1.50000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.99E-09	1.47E-08	1.12E-08	4.11E-08
BENZO(G,H,I)PERYLENE	0.20996	0.55000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.05E-09	5.38E-09	5.75E-09	1.51E-08
CHRYSENE	0.60875	3.20000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.96E-09	3.13E-08	1.67E-08	8.77E-08
DIBENZO(A,H)ANTHRACENE	0.06275	0.24000	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.14E-10	2.35E-09	1.72E-09	6.58E-09
FLUORANTHENE	1.58750	14.00000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.55E-08	1.37E-07	4.35E-08	3.84E-07
FLUORENE	0.09452	0.67500	100	1.00	1.00E-06	7	25	70	25,550	9,125	9.25E-10	6.60E-09	2.59E-09	1.85E-08
INDENO(1,2,3-CD)PYRENE	0.22692	0.69000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.22E-09	6.75E-09	6.22E-09	1.89E-08
PERYLENE	0.18458	0.86000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.81E-09	8.41E-09	5.06E-09	2.36E-08
PHENANTHRENE	0.84479	6.20000	100	1.00	1.00E-06	7	25	70	25,550	9,125	8.27E-09	6.07E-08	2.31E-08	1.70E-07
PYRENE	1.30979	10.00000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.28E-08	9.78E-08	3.59E-08	2.74E-07
POLYCHLORINATED BIPHENYLS (PCBs)														
TOTAL PCBs (AROCHLOR)	0.05965	0.34770	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.84E-10	3.40E-09	1.63E-09	9.53E-09

TABLE 3-41
INGESTION OF CHEMICALS IN SEDIMENT FROM CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS														
ALUMINUM	37,476.4706	77,900.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.67E-04	7.62E-04	1.03E-03	2.13E-03
ARSENIC	15.8706	28.7000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.55E-07	2.81E-07	4.35E-07	7.86E-07
CADMIUM	0.7535	1.1000	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.37E-09	1.08E-08	2.06E-08	3.01E-08
CHROMIUM	150.0471	211.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.47E-06	2.06E-06	4.11E-06	5.78E-06
COPPER	49.4656	92.4000	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.84E-07	9.04E-07	1.36E-06	2.53E-06
IRON	29,311.7647	40,000.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.87E-04	3.91E-04	8.03E-04	1.10E-03
LEAD	65.7176	104.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.43E-07	1.02E-06	1.80E-06	2.85E-06
MANGANESE	330.2353	542.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.23E-06	5.30E-06	9.05E-06	1.48E-05
MERCURY	0.2550	0.6700	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.50E-09	6.56E-09	6.99E-09	1.84E-08
NICKEL	32.2235	44.5000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.15E-07	4.35E-07	8.83E-07	1.22E-06
SILVER	0.7982	1.3000	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.81E-09	1.27E-08	2.19E-08	3.56E-08
ZINC	135.5765	206.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.33E-06	2.02E-06	3.71E-06	5.64E-06
PESTICIDES														
ALDRIN	0.00063	0.00180	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.14E-12	1.76E-11	1.72E-11	4.93E-11
ALPHA-CHLORDANE	0.00072	0.00237	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.02E-12	2.32E-11	1.96E-11	6.48E-11
HEPTACHLOR EPOXIDE	0.00035	0.00090	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.39E-12	8.81E-12	9.48E-12	2.47E-11
HEXACHLOROBENZENE	0.00112	0.00720	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.10E-11	7.05E-11	3.08E-11	1.97E-10
LINDANE (GAMMA-BHC)	0.00038	0.00079	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.75E-12	7.71E-12	1.05E-11	2.16E-11
MIREX	0.00057	0.00170	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.61E-12	1.66E-11	1.57E-11	4.66E-11
TRANS-NONACHLOR	0.00052	0.00123	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.12E-12	1.21E-11	1.43E-11	3.38E-11
o,p'-DDD	0.00184	0.00290	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.80E-11	2.84E-11	5.04E-11	7.95E-11
o,p'-DDE	0.00114	0.00220	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.12E-11	2.15E-11	3.13E-11	6.03E-11
o,p'-DDT	0.00117	0.00420	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.14E-11	4.11E-11	3.19E-11	1.15E-10
p,p'-DDD	0.00726	0.01600	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.10E-11	1.57E-10	1.99E-10	4.38E-10
p,p'-DDE	0.00345	0.00640	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.38E-11	6.26E-11	9.46E-11	1.75E-10
p,p'-DDT	0.00517	0.01411	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.05E-11	1.38E-10	1.42E-10	3.87E-10

TABLE 3-41
INGESTION OF CHEMICALS IN SEDIMENT FROM CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
POLYAROMATIC HYDROCARBONS														
ANTHRACENE	0.09633	0.19000	100	1.00	1.00E-06	7	25	70	25,550	9,125	9.43E-10	1.86E-09	2.64E-09	5.21E-09
BENZO(A)ANTHRACENE	0.28100	0.45000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.75E-09	4.40E-09	7.70E-09	1.23E-08
BENZO(A)PYRENE	0.33133	0.57000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.24E-09	5.58E-09	9.08E-09	1.56E-08
BENZO(E)PYRENE	0.25667	0.42000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.51E-09	4.11E-09	7.03E-09	1.15E-08
BENZO(G,H,I)PERYLENE	0.17167	0.38000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.68E-09	3.72E-09	4.70E-09	1.04E-08
CHRYSENE	0.30200	0.52000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.95E-09	5.09E-09	8.27E-09	1.42E-08
DIBENZO(A,H)ANTHRACENE	0.04253	0.08400	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.16E-10	8.22E-10	1.17E-09	2.30E-09
FLUORANTHENE	0.58067	1.00000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.68E-09	9.78E-09	1.59E-08	2.74E-08
FLUORENE	0.03157	0.06900	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.09E-10	6.75E-10	8.65E-10	1.89E-09
INDENO(1,2,3-CD)PYRENE	0.17633	0.34000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.73E-09	3.33E-09	4.83E-09	9.32E-09
PERYLENE	0.11553	0.17000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.13E-09	1.66E-09	3.17E-09	4.66E-09
PHENANTHRENE	0.29700	0.53000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.91E-09	5.19E-09	8.14E-09	1.45E-08
PYRENE	0.56033	0.94000	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.48E-09	9.20E-09	1.54E-08	2.58E-08
POLYCHLORINATED BIPHENYLS (PCBs)														
TOTAL PCBs (AROCHLOR)	0.08164	0.19040	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.99E-10	1.86E-09	2.24E-09	5.22E-09

TABLE 3-42
INGESTION OF CHEMICALS IN SEDIMENT FROM YORK HARBOR SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	INGESTION RATE (mg/day)	INGESTED FROM CONTAMINATED SOURCE	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS														
ALUMINUM	18,700.0000	20,700.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.83E-04	2.03E-04	5.12E-04	5.67E-04
ARSENIC	0.7350	1.2000	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.19E-09	1.17E-08	2.01E-08	3.29E-08
CHROMIUM	27.8500	34.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.73E-07	3.33E-07	7.63E-07	9.32E-07
COPPER	1.2950	1.6000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.27E-08	1.57E-08	3.55E-08	4.38E-08
IRON	7,350.0000	9,250.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.19E-05	9.05E-05	2.01E-04	2.53E-04
LEAD	19.9000	25.2000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.95E-07	2.47E-07	5.45E-07	6.90E-07
MANGANESE	104.3000	135.0000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.02E-06	1.32E-06	2.86E-06	3.70E-06
NICKEL	9.3000	11.1000	100	1.00	1.00E-06	7	25	70	25,550	9,125	9.10E-08	1.09E-07	2.55E-07	3.04E-07
ZINC	19.5000	21.7000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.91E-07	2.12E-07	5.34E-07	5.95E-07
PESTICIDES														
ALDRIN	0.00068	0.00072	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.66E-12	7.05E-12	1.87E-11	1.98E-11
p,p'-DDT	0.00598	0.00691	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.85E-11	6.76E-11	1.64E-10	1.89E-10
POLYAROMATIC HYDROCARBONS														
ANTHRACENE	0.01500	0.01700	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.47E-10	1.66E-10	4.11E-10	4.66E-10
BENZO(A)ANTHRACENE	0.04450	0.06500	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.35E-10	6.36E-10	1.22E-09	1.78E-09
BENZO(A)PYRENE	0.05550	0.08400	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.43E-10	8.22E-10	1.52E-09	2.30E-09
BENZO(E)PYRENE	0.03900	0.06000	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.82E-10	5.87E-10	1.07E-09	1.64E-09
BENZO(G,H,I)PERYLENE	0.02450	0.04500	100	1.00	1.00E-06	7	25	70	25,550	9,125	2.40E-10	4.40E-10	6.71E-10	1.23E-09
CHRYSENE	0.05050	0.07600	100	1.00	1.00E-06	7	25	70	25,550	9,125	4.94E-10	7.44E-10	1.38E-09	2.08E-09
FLUORANTHENE	0.11200	0.15000	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.10E-09	1.47E-09	3.07E-09	4.11E-09
FLUORENE	0.00550	0.00600	100	1.00	1.00E-06	7	25	70	25,550	9,125	5.38E-11	5.87E-11	1.51E-10	1.64E-10
INDENO(1,2,3-CD)PYRENE	0.03150	0.05700	100	1.00	1.00E-06	7	25	70	25,550	9,125	3.08E-10	5.58E-10	8.63E-10	1.56E-09
PERYLENE	0.01400	0.02400	100	1.00	1.00E-06	7	25	70	25,550	9,125	1.37E-10	2.35E-10	3.84E-10	6.58E-10
PHENANTHRENE	0.06450	0.07400	100	1.00	1.00E-06	7	25	70	25,550	9,125	6.31E-10	7.24E-10	1.77E-09	2.03E-09
PYRENE	0.09450	0.13000	100	1.00	1.00E-06	7	25	70	25,550	9,125	9.25E-10	1.27E-09	2.59E-09	3.56E-09
POLYCHLORINATED BIPHENYLS (PCBs)														
TOTAL PCBs (AROCHLOR)	0.00810	0.01030	100	1.00	1.00E-06	7	25	70	25,550	9,125	7.93E-11	1.01E-10	2.22E-10	2.82E-10

TABLE 3-43

Dermal Contact with Chemicals in Sediments For Current Conditions
Recreational Exposures While Swimming, Fishing and Wading in River, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Absorbed Dose (mg/kg - day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

CS	=	Chemical Concentration in Sediment (mg/kg)
CF	=	Conversion Factor (10^{-6} kg/mg)
SA	=	Skin Surface Area Available for Contact (cm^2/event)
AF	=	Skin to Sediment Adherence Factor (mg/cm^2)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CS	=	Site-specific measured value
CF	=	10^{-6} kg/mg
SA	=	1,960 cm^2/event = for adults (feet, hands) assumed estimates based on values given in USEPA, 1989c
AF	=	0.5 mg/cm^2 (USEPA, 1989c)
ABS	=	Chemical Specific: Cadmium 1% (USEPA, 1992) PCBs 6% (USEPA, 1992)
EF	=	7 days/year (based on national average for swimming; USDOI in EPA 1988 by EPA 1989a)
ED	=	30 years (USEPA 1991)
BW	=	70 kg adult (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December, 1989a)

TABLE 3-43
DERMAL CONTACT WITH CHEMICALS IN SEDIMENTS FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING, FISHING AND WADING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAX-IMUM CONC. (mg/kg)	SKIN SURFACE AREA (cm2/event)	SKIN TO SEDIMENT ADHERENCE FACTOR (mg/cm2)	CONVER-SION FACTOR (1.0E-06 kg/mg)	EXPO-SURE FRE-QUENCY (days/yr)	ABSORP-TION FACTOR	EXPO-SURE DUR-ATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCIN-OGENS	AVERAGING TIME (days) NONCAR-CINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS															
CADMIUM	0.5794	2.0000	1,960	0.50	1.00E-06	7	0.01	30	70	25,550	10,950	6.67E-10	2.30E-09	1.56E-09	5.37E-09
POLYCHLORINATED BIPHENYLS															
TOTAL PCBs (AROCHLOR)	0.06702	0.34770	1,960	0.50	1.00E-06	7	0.06	30	70	25,550	10,950	4.60E-10	2.40E-09	1.08E-09	5.60E-09

TABLE 3-44
DERMAL CONTACT WITH CHEMICALS IN SEDIMENTS FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'ISLAND EMBAYMENT FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING, FISHING AND WADING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/kg)	MAX-IMUM CONC. (mg/kg)	SKIN SURFACE AREA (cm2/event)	SKIN TO SEDIMENT ADHERENCE FACTOR (mg/cm2)	CONVER-SION FACTOR (1.0E-06 kg/mg)	EXPO-SURE FRE-QUENCY (days/yr)	ABSORP-TION FACTOR	EXPO-SURE DUR-ATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCIN-OGENS	AVERAGING TIME (days) NONCAR-CINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS MAX	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) NONCARCINOGENS AVG	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) NONCARCINOGENS MAX
PESTICIDES															
ALDRIN	0.00035	0.00068	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.69E-12	3.28E-12	4.73E-12	9.18E-12
ALPHA-CHLORDANE	0.00062	0.00098	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.96E-12	4.70E-12	8.28E-12	1.32E-11
o,p'-DDD	0.00055	0.00082	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.62E-12	3.92E-12	7.34E-12	1.10E-11
o,p'-DDE	0.00022	0.00031	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.07E-12	1.47E-12	2.99E-12	4.12E-12
p,p'-DDD	0.00126	0.00349	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	6.02E-12	1.67E-11	1.68E-11	4.68E-11
p,p'-DDE	0.00074	0.00219	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.53E-12	1.05E-11	9.88E-12	2.94E-11
p,p'-DDT	0.00706	0.01179	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.38E-11	5.65E-11	9.47E-11	1.58E-10
POLYAROMATIC HYDROCARBONS															
ANTHRACENE	0.19420	0.40000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	9.31E-09	1.92E-08	2.61E-08	5.37E-08
BENZO(A)ANTHRACENE	0.35460	0.68000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.70E-08	3.26E-08	4.76E-08	9.13E-08
BENZO(A)PYRENE	0.37600	0.70000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.80E-08	3.36E-08	5.05E-08	9.40E-08
BENZO(E)PYRENE	0.24220	0.48000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.16E-08	2.30E-08	3.25E-08	6.44E-08
BENZO(G,H,I)PERYLENE	0.14460	0.29000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	6.93E-09	1.39E-08	1.94E-08	3.89E-08
CHRYSENE	0.33700	0.63000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.62E-08	3.02E-08	4.52E-08	8.46E-08
DIBENZO(A,H)ANTHRACENE	0.05670	0.12000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.72E-09	5.75E-09	7.61E-09	1.61E-08
FLUORANTHENE	0.66120	1.20000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	3.17E-08	5.75E-08	8.88E-08	1.61E-07
FLUORENE	0.03820	0.08200	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.83E-09	3.93E-09	5.13E-09	1.10E-08
INDENO(1,2,3-CD)PYRENE	0.18460	0.38000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	8.85E-09	1.82E-08	2.48E-08	5.10E-08
PERYLENE	0.10280	0.20000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	4.93E-09	9.59E-09	1.38E-08	2.68E-08
PHENANTHRENE	0.34620	0.64000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.66E-08	3.07E-08	4.65E-08	8.59E-08
PYRENE	0.60440	1.10000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.90E-08	5.27E-08	8.11E-08	1.48E-07
POLYCHLORINATED BIPHENYLS															
TOTAL PCBs (AROCHLOR)	0.05452	0.13360	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.61E-09	6.41E-09	7.32E-09	1.79E-08

TABLE 3-45

Dermal Contact with Chemicals in Surface Water For Current Conditions
Recreational Exposures While Swimming, Fishing and Wading in River, Off-Shore Impacts
Calculations for Potential Chronic Daily Intakes
Portsmouth Naval Shipyard

$$\text{Absorbed Dose (mg/kg - day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

CS	=	Chemical Concentration in Surface Water (mg/kg)
CF	=	Conversion Factor (10^{-6} kg/mg)
SA	=	Skin Surface Area Available for Contact (cm^2/event)
AF	=	Skin to Surface Water Adherence Factor (mg/cm^2)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CS	=	Site-specific measured value
CF	=	10^{-6} kg/mg
SA	=	1,960 cm^2/event = for adults (feet, hands) assumed estimates based on values given in USEPA, 1989c
AF	=	0.5 mg/cm^2 (USEPA, 1989c)
ABS	=	Chemical Specific: Cadmium 1% (USEPA, 1992) Volatile organic compounds 50% (USEPA, 1989c) Semivolatile organic compounds (USEPA, 1989c) PAHs 5% (USEPA, 1989c) PCBs 6% (USEPA, 1992) Inorganics negligible (USEPA, 1989c) Pesticides: - high sorption to soils 5% (USEPA, June, 1989) - low sorption to soils 50% (USEPA, June, 1989)
EF	=	7 days/year (based on national average for swimming; USDOI in EPA 1988 by EPA 1989a)
ED	=	30 years (USEPA 1991)
BW	=	70 kg adult (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a) 365 days/year x 70 years for carcinogenic effects (USEPA, December, 1989a)

TABLE 3-45
DERMAL CONTACT WITH CHEMICALS IN SEDIMENTS FROM AROUND SEAVEY ISLAND FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING, FISHING AND WADING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	SKIN SURFACE AREA (cm2/event)	SKIN TO SEDIMENT ADHERENCE FACTOR (mg/cm2)	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	ABSORPTION FACTOR	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day)			
										CARCINOGENS	NONCARCINOGENS	CARCINOGENS		NONCARCINOGENS	
												AVG	MAX	AVG	MAX
PESTICIDES															
ALDRIN	0.00280	0.02240	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.34E-11	1.07E-10	3.75E-11	3.01E-10
ALPHA-CHLORDANE	0.00068	0.00292	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.26E-12	1.40E-11	9.13E-12	3.92E-11
HEXACHLOROBENZENE	0.00033	0.00086	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.59E-12	4.13E-12	4.46E-12	1.16E-11
LINDANE (GAMMA-BHC)	0.00046	0.00106	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.20E-12	5.10E-12	6.16E-12	1.43E-11
MIREX	0.00039	0.00120	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.86E-12	5.75E-12	5.20E-12	1.61E-11
TRANS-NONACHLOR	0.00034	0.00148	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.63E-12	7.08E-12	4.58E-12	1.98E-11
o,p'-DDD	0.00080	0.00372	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.83E-12	1.78E-11	1.07E-11	4.99E-11
o,p'-DDE	0.00058	0.00223	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.80E-12	1.07E-11	7.83E-12	2.99E-11
o,p'-DDT	0.00114	0.00950	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	5.47E-12	4.55E-11	1.53E-11	1.28E-10
p,p'-DDD	0.00303	0.01908	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.45E-11	9.15E-11	4.06E-11	2.56E-10
p,p'-DDE	0.00186	0.00539	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	8.90E-12	2.58E-11	2.49E-11	7.24E-11
p,p'-DDT	0.01876	0.11956	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	9.00E-11	5.73E-10	2.52E-10	1.61E-09
POLYAROMATIC HYDROCARBONS															
ANTHRACENE	0.32050	1.90000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.54E-08	9.11E-08	4.30E-08	2.55E-07
BENZO(A)ANTHRACENE	0.61083	3.60000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.93E-08	1.73E-07	8.20E-08	4.83E-07
BENZO(A)PYRENE	0.56125	2.20000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.69E-08	1.05E-07	7.53E-08	2.95E-07
BENZO(E)PYRENE	0.40750	1.50000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.95E-08	7.19E-08	5.47E-08	2.01E-07
BENZO(G,H,I)PERYLENE	0.20996	0.55000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.01E-08	2.64E-08	2.82E-08	7.38E-08
CHRYSENE	0.60875	3.20000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.92E-08	1.53E-07	8.17E-08	4.30E-07
DIBENZO(A,H)ANTHRACENE	0.06275	0.24000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	3.01E-09	1.15E-08	8.42E-09	3.22E-08
FLUORANTHENE	1.58750	14.00000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	7.61E-08	6.71E-07	2.13E-07	1.88E-06
FLUORENE	0.09452	0.67500	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	4.53E-09	3.24E-08	1.27E-08	9.06E-08
INDENO(1,2,3-CD)PYRENE	0.22692	0.69000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.09E-08	3.31E-08	3.05E-08	9.26E-08
PERYLENE	0.18458	0.86000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	8.85E-09	4.12E-08	2.48E-08	1.15E-07
PHENANTHRENE	0.84479	6.20000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	4.05E-08	2.97E-07	1.13E-07	8.32E-07
PYRENE	1.30979	10.00000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	6.28E-08	4.79E-07	1.76E-07	1.34E-06
POLYCHLORINATED BIPHENYLS															
TOTAL PCBs (AROCHLOR)	0.05965	0.34770	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.86E-09	1.67E-08	8.01E-09	4.67E-08

TABLE 3-46
DERMAL CONTACT WITH CHEMICALS IN SEDIMENT FROM CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING, FISHING AND WADING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	SKIN SURFACE AREA (cm2/event)	SKIN TO SEDIMENT ADHERENCE FACTOR (mg/cm2)	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	ABSORPTION FACTOR	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
PESTICIDES															
ALDRIN	0.00063	0.00180	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.01E-12	8.63E-12	8.42E-12	2.42E-11
ALPHA-CHLORDANE	0.00072	0.00237	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.44E-12	1.13E-11	9.63E-12	3.18E-11
HEPTACHLOR EPOXIDE	0.00035	0.00090	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.66E-12	4.32E-12	4.64E-12	1.21E-11
HEXACHLOROBENZENE	0.00112	0.00720	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	5.39E-12	3.45E-11	1.51E-11	9.67E-11
LINDANE (GAMMA-BHC)	0.00038	0.00079	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.84E-12	3.78E-12	5.14E-12	1.06E-11
MIREX	0.00057	0.00170	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.75E-12	8.15E-12	7.69E-12	2.28E-11
TRANS-NONACHLOR	0.00052	0.00123	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.51E-12	5.91E-12	7.02E-12	1.66E-11
o,p'-DDD	0.00184	0.00290	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	8.83E-12	1.39E-11	2.47E-11	3.89E-11
o,p'-DDE	0.00114	0.00220	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	5.48E-12	1.05E-11	1.54E-11	2.95E-11
o,p'-DDT	0.00117	0.00420	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	5.59E-12	2.01E-11	1.56E-11	5.64E-11
p,p'-DDD	0.00726	0.01600	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.48E-11	7.67E-11	9.75E-11	2.15E-10
p,p'-DDE	0.00345	0.00640	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	1.66E-11	3.07E-11	4.64E-11	8.59E-11
p,p'-DDT	0.00517	0.01411	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.48E-11	6.77E-11	6.93E-11	1.89E-10
POLYAROMATIC HYDROCARBONS															
ANTHRACENE	0.09633	0.19000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	4.62E-09	9.11E-09	1.29E-08	2.55E-08
BENZO(A)ANTHRACENE	0.28100	0.45000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.35E-08	2.16E-08	3.77E-08	6.04E-08
BENZO(A)PYRENE	0.33133	0.57000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.59E-08	2.73E-08	4.45E-08	7.65E-08
BENZO(E)PYRENE	0.25667	0.42000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.23E-08	2.01E-08	3.45E-08	5.64E-08
BENZO(G,H,I)PERYLENE	0.17167	0.38000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	8.23E-09	1.82E-08	2.30E-08	5.10E-08
CHRYSENE	0.30200	0.52000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.45E-08	2.49E-08	4.05E-08	6.98E-08
DIBENZO(A,H)ANTHRACENE	0.04253	0.08400	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.04E-09	4.03E-09	5.71E-09	1.13E-08
FLUORANTHENE	0.58067	1.00000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.78E-08	4.79E-08	7.80E-08	1.34E-07
FLUORENE	0.03157	0.06900	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.51E-09	3.31E-09	4.24E-09	9.26E-09
INDENO(1,2,3-CD)PYRENE	0.17633	0.34000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	8.45E-09	1.63E-08	2.37E-08	4.56E-08
PERYLENE	0.11553	0.17000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	5.54E-09	8.15E-09	1.55E-08	2.28E-08
PHENANTHRENE	0.29700	0.53000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.42E-08	2.54E-08	3.99E-08	7.12E-08
PYRENE	0.56033	0.94000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.69E-08	4.51E-08	7.52E-08	1.26E-07
POLYCHLORINATED BIPHENYLS															
TOTAL PCBs (AROCHLOR)	0.08164	0.19040	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	3.91E-09	9.13E-09	1.10E-08	2.56E-08

TABLE 3-47
DERMAL CONTACT WITH CHEMICALS IN SEDIMENT FROM YORK HARBOR SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURE WHILE SWIMMING, FISHING AND WADING IN RIVER, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/kg)	MAXIMUM CONC. (mg/kg)	SKIN SURFACE AREA (cm2/event)	SKIN TO SEDIMENT ADHERENCE FACTOR (mg/cm2)	CONVERSION FACTOR (1.0E-06 kg/mg)	EXPOSURE FREQUENCY (days/yr)	ABSORPTION FACTOR	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCINOGENS	AVERAGING TIME (days) NONCARCINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
PESTICIDES															
ALDRIN	0.00068	0.00072	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	3.27E-12	3.46E-12	9.14E-12	9.68E-12
p,p'-DDT	0.00598	0.00691	1,960	0.50	1.00E-06	7	0.05	25	70	25,550	9,125	2.87E-11	3.31E-11	8.03E-11	9.28E-11
POLYAROMATIC HYDROCARBONS															
ANTHRACENE	0.01500	0.01700	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	7.19E-10	8.15E-10	2.01E-09	2.28E-09
BENZO(A)ANTHRACENE	0.04450	0.06500	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.13E-09	3.12E-09	5.97E-09	8.73E-09
BENZO(A)PYRENE	0.05550	0.08400	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.66E-09	4.03E-09	7.45E-09	1.13E-08
BENZO(E)PYRENE	0.03900	0.06000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.87E-09	2.88E-09	5.24E-09	8.05E-09
BENZO(G,H,I)PERYLENE	0.02450	0.04500	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.17E-09	2.16E-09	3.29E-09	6.04E-09
CHRYSENE	0.05050	0.07600	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.42E-09	3.64E-09	6.78E-09	1.02E-08
FLUORANTHENE	0.11200	0.15000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	5.37E-09	7.19E-09	1.50E-08	2.01E-08
FLUORENE	0.00550	0.00600	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	2.64E-10	2.88E-10	7.38E-10	8.05E-10
INDENO(1,2,3-CD)PYRENE	0.03150	0.05700	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	1.51E-09	2.73E-09	4.23E-09	7.65E-09
PERYLENE	0.01400	0.02400	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	6.71E-10	1.15E-09	1.88E-09	3.22E-09
PHENANTHRENE	0.06450	0.07400	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	3.09E-09	3.55E-09	8.66E-09	9.93E-09
PYRENE	0.09450	0.13000	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	4.53E-09	6.23E-09	1.27E-08	1.75E-08
POLYCHLORINATED BIPHENYLS															
TOTAL PCBs (AROCHLOR)	0.00810	0.01030	1,960	0.50	1.00E-06	7	0.50	25	70	25,550	9,125	3.88E-10	4.94E-10	1.09E-09	1.38E-09

TABLE 3-48

Ingestion of Chemicals in Surface Water For Current Conditions
Recreational Exposures While Swimming, Fishing, and Wading, Off-Shore Impacts
Calculations for Potential Chronic Daily Intake
Portsmouth Naval Shipyard

$$\text{Intake (mg/kg - day)} = \frac{CW \times CR \times ET \times EF \times ED}{BW \times AT}$$

CW	=	Chemical concentration in Water (mg/liter)
CR	=	Contact Rate (liters/hour)
ET	=	Exposure Time (hours/event)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Variable Values:

CW	=	Site-specific measured or modeled value
CR	=	.050 liters/hour (USEPA 1989c)
ET	=	2.6 hours/day (National average for swimming, USDOI in EPA 1988b, EPA 1989a)
EF	=	7 events/year (USEPA 1989a)
ED	=	30 years (USEPA 1991)
BW	=	70 kg (USEPA 1991)
AT	=	365 days/year x 30 years for noncarcinogenic effects (USEPA, December, 1989a)
		365 days/year for 70 years for carcinogenic effects (USEPA, December, 1989a)

TABLE 3-48
INGESTION OF CHEMICALS IN SURFACE WATER FOR CURRENT CONDITONS FOR SAMPLES COLLECTED FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/l)	MAX-IMUM CONC. (mg/l)	CONTACT RATE (liters/hour)	EXPOSURE TIME (hours/event)	EXPOSURE FREQUENCY (events/year)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCIN-OGENS	NONCAR-CINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	0.0349	0.1630	0.050	2.6	7	30	70	25,550	10,950	5.33E-07	2.49E-06	1.24E-06	5.81E-06
IRON	0.0445	0.2200	0.050	2.6	7	30	70	25,550	10,950	6.80E-07	3.36E-06	1.59E-06	7.84E-06
LEAD	0.0006	0.0034	0.050	2.6	7	30	70	25,550	10,950	9.65E-09	5.19E-08	2.25E-08	1.21E-07

TABLE 3-49
INGESTION OF CHEMICALS IN SURFACE WATER FOR CURRENT CONDITONS
FOR SAMPLES COLLECTED FROM THE LOWER PISCATAQUA EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/l)	MAXIMUM CONC. (mg/l)	CONTACT RATE (liters/hour)	EXPOSURE TIME (hours/event)	EXPOSURE FREQUENCY (events/year)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day)			
								CARCINOGENS	NONCARCINOGENS	CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINUM	0.0538	0.1630	0.050	2.6	7	25	70	25,550	9,125	6.84E-07	2.07E-06	1.92E-06	5.81E-06
IRON	0.0541	0.2200	0.050	2.6	7	25	70	25,550	9,125	6.88E-07	2.80E-06	1.93E-06	7.84E-06
LEAD	0.0006	0.0015	0.050	2.6	7	25	70	25,550	9,125	7.75E-09	1.91E-08	2.17E-08	5.34E-08
NICKEL	0.0084	0.0460	0.050	2.6	7	25	70	25,550	9,125	1.07E-07	5.85E-07	3.00E-07	1.64E-06

TABLE 3-50
INGESTION OF CHEMICALS IN SURFACE WATER FOR CURRENT CONDITONS FOR SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVERAGE CONC. (mg/l)	MAXIMUM CONC. (mg/l)	CONTACT RATE (liters/hour)	EXPOSURE TIME (hours/event)	EXPOSURE FREQUENCY (events/year)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
								CARCINOGENS	NONCARCINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	0.0298	0.1035	0.050	2.6	7	25	70	25,550	9,125	3.79E-07	1.32E-06	1.06E-06	3.69E-06
IRON	0.0439	0.1080	0.050	2.6	7	25	70	25,550	9,125	5.58E-07	1.37E-06	1.56E-06	3.85E-06
LEAD	0.0008	0.0034	0.050	2.6	7	25	70	25,550	9,125	1.00E-08	4.32E-08	2.80E-08	1.21E-07

TABLE 3-51
INGESTION OF CHEMICALS IN SURFACE WATER FOR CURRENT CONDITONS FOR SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

								AVERAGING TIME (days)		POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day)			
										CARCINOGENS		NONCARCINOGENS	
ANALYTE	AVER-AGE CONC. (mg/l)	MAX-IMUM CONC. (mg/l)	CONTACT RATE (liters/hour)	EXPOSURE TIME (hours/event)	EXPOSURE FREQUENCY (events/year)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	CARCIN-OGENS	NONCAR-CINOGENS	AVG	MAX	AVG	MAX
INORGANICS													
ALUMINUM	0.0256	0.0820	0.050	2.6	7	25	70	25,550	9,125	3.26E-07	1.04E-06	9.12E-07	2.92E-06
IRON	0.0377	0.1090	0.050	2.6	7	25	70	25,550	9,125	4.79E-07	1.39E-06	1.34E-06	3.88E-06

TABLE 3-52
INGESTION OF CHEMICALS IN SURFACE WATER FOR CURRENT CONDITONS FOR SAMPLES COLLECTED FROM YORK HARBOR
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
CALCULATIONS FOR POTENTIAL CHRONIC DAILY INTAKES
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	AVER-AGE CONC. (mg/l)	MAX-IMUM CONC. (mg/l)	CONTACT RATE (liters/hour)	EXPOSURE TIME (hours/event)	EXPOSURE FREQUENCY (events/year)	EXPOSURE DURATION (yrs)	BODY WEIGHT (kg)	AVERAGING TIME (days) CARCIN-OGENS	AVERAGING TIME (days) NONCAR-CINOGENS	POTENTIAL CHRONIC DAILY INTAKE EXPsi (mg/kg/day) CARCINOGENS AVG	CARCINOGENS MAX	NONCARCINOGENS AVG	NONCARCINOGENS MAX
INORGANICS													
ALUMINIUM	0.0882	0.1880	0.050	2.6	7	25	70	25,550	9,125	1.12E-06	2.39E-06	3.14E-06	6.70E-06
IRON	0.1060	0.2980	0.050	2.6	7	25	70	25,550	9,125	1.35E-06	3.79E-06	3.78E-06	1.06E-05
LEAD	0.0006	0.0018	0.050	2.6	7	25	70	25,550	9,125	8.01E-09	2.29E-08	2.24E-08	6.41E-08

TABLE 3-53

IEUBK MODEL
SCREEN 2-4
DATA ENTRY FOR AIR

	Mussels	Lobster Tail, Whole Lobster, Flounder
Vary Air Concentration by Year	No	No
Outdoor Air Lead Concentration ($\mu g/m^3$)	0.100*	0.100*
Indoor Air Lead Concentration (% of Outdoor)	30.0	30.0
View/Change Time Spent Outdoors	Default	Default
View/Change Ventilation Rates	Default	Default
View/Change Lung Absorption %	Default	Default

* All background air lead samples were non-detects. Default value was used.

TABLE 3-54

IEUBK MODEL
SCREEN 2-5
DATA ENTRY FOR DIET

	Mussels	Lobster Tail, Whole Lobster, Flounder
View/Change Dietary Lead Intake	Default	Default
Use Alternate Diet Values	Yes	Yes
Change GI Values/Bioavailability	No	No

TABLE 3-55

IEUBK MODEL
SCREEN 2-6
DATA ENTRY FOR DIET

	Mussels Average Ingestion Rate	Mussels Worst Case Ingestion Rate	Lobster Tail, Whole Lobster, Flounder Average Ingestion Rate	Lobster Tail, Whole Lobster, Flounder Worst Case Ingestion Rate	Weighted Average*	
					Avg.	Worst Case
Home Grown Fruits						
Concentration	0.00	0.00	0.00	0.00	0.00	0.00
Percent	0	0	0	0	0	0
Home Grown Vegetables						
Concentration	0	0	0	0	0	0
Percent	0	0	0	0	0	0
Fish From Fishing						
Concentration	1.03	1.03	0.04	0.04	0.24	0.24
Percent	10.0	50.0	10.0	50.0	10.0	50.0
Game Animals From Hunting						
Ethnic Preference	---	---	---	---	--	--
Regional Preference	---	---	---	---	--	--

* Weighted Average of Mussels, Lobster Tail, Whole Lobsters, and Flounder, Each Weighted Equally.

TABLE 3-56

IEUBK MODEL
SCREEN 2-7
DATA ENTRY FOR DRINKING WATER

	Mussels	**Lobster Tail, Whole Lobster, Flounder**
Enter Lead Concentration in Drinking Water (μg/L)	5.00*	5.00*
View/Change Drinking Water Intake	Default	Default
Use of Alternate Water Values	No	No
Change GI Values/Bioavailability	No	No

* Represents municipal drinking water levels, Town of Kittery.

TABLE 3-57

IEUBK MODEL
SCREEN 2-9
DATA ENTRY FOR SOIL/DUST

	Mussels	**Lobster Tail, Whole Lobster, Flounder**
Soil Lead Levels (μg/g)	175*	175*
Indoor Dust Lead Levels (μg/g)	175	175
Soil/Dust Ingestion Weighting Factor	45.0	45.0
View/Change Amount of Soil/Dust Ingested Daily	Default	Default
Change GI Values/Bioavailability	No	No

* Represents average soil lead concentration of samples collected on-site and off-site in areas removed from the SWMUs; should represent the community at large.

TABLE 3-58

IEUBK MODEL
SCREEN 2-15
MATERNAL DATA

Maternal Contribution Matrix: Infant Motel
Mother's Blood Lead Concentration at Birth μg/dL: 2.50 (Default)

TABLE 5A
RANGE OF POTENTIAL SITE-WIDE RISKS FOR OFF-SHORE MEDIA FOR LOWER PISCATAQUA SAMPLE LOCATIONS
PORTSMOUTH NAVAL SHIPYARD.

PATHWAY	CUMULATIVE CARCINOGENIC RISK		CUMULATIVE NONCARCINOGENIC RISKS	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-1 CONSUMPTION OF LOBSTER TAIL FLESH, RECREATIONAL EXPOSURES	1.81E-03	4.14E-03	7.60E+00	1.43E+00
TABLE 5-6 CONSUMPTION OF LOBSTER TAIL FLESH FOR SUBSISTENCE FISHING	4.41E-03	1.01E-02	1.86E+01	3.49E+01
TABLE 5-11 CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS), RECREATIONAL EXPOSURES	2.31E-03	5.19E-03	8.96E+00	1.73E+01
TABLE 5-13 CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS), FOR SUBSISTENCE FISHING	5.67E-03	1.27E-02	2.19E+01	4.22E+01
TABLE 5-15 CONSUMPTION OF MUSSELS, RECREATIONAL EXPOSURES	5.49E-04	1.44E-03	2.58E+00	6.52E+00
TABLE 5-21 CONSUMPTION OF MUSSELS FOR SUBSISTENCE FISHING	1.34E-03	3.51E-03	6.30E+00	1.59E+01
TABLE 5-27 CONSUMPTION OF FLOUNDER FILLET, RECREATIONAL EXPOSURES	9.03E-04	1.18E-03	3.78E+00	4.59E+00
TABLE 5-32 CONSUMPTION OF FLOUNDER FILLET FOR SUBSISTENCE FISHING	2.21E-03	2.87E-03	9.25E+00	1.12E+01
TABLE 5-37 INGESTION OF SEDIMENT, RECREATIONAL EXPOSURES	3.76E-07	1.33E-06	2.26E-03	5.16E-03
TABLE 5-42 DERMAL CONTACT WITH SEDIMENT, RECREATIONAL EXPOSURES	3.54E-09	1.85E-08	3.11E-06	1.07E-05
TABLE 5-47 INGESTION OF SURFACE WATER, RECREATIONAL EXPOSURES	-	-	4.29E-07	2.00E-06
TABLE 5-56 COMBINED RISKS CALCULATED FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT, RECREATIONAL EXPOSURES	5.49E-04	1.44E-03	2.58E+00	6.52E+00
TABLE 5-57 COMBINED RISKS CALCULATED FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT FOR SUBSISTENCE FISHING	1.34E-03	3.51E-03	6.30E+00	1.59E+01
TABLE 5-58 COMBINED RISKS CALCULATED FOR INGESTION OF SURFACE WATER AND SEDIMENT AND DERMAL CONTACT WITH SEDIMENT, RECREATIONAL EXPOSURES	3.80E-07	1.35E-06	2.26E-03	5.17E-03
TABLE 5-59 COMBINED RISKS CALCULATED FOR INGESTION OF SEDIMENT, SURFACE WATER, LOBSTER TAIL FLESH, AND DERMAL CONTACT WITH SEDIMENT, RECREATIONAL EXPOSURES	1.81E-03	4.14E-03	7.60E+00	1.43E+01

TABLE 5-1
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	2.13E-03	5.80E-03		ND	-	-	4.98E-03	1.35E-02	2.90E+00		1.72E-03	4.67E-03
ARSENIC	8.56E-04	1.67E-03	1.75E+00		1.50E-03	2.92E-03	2.00E-03	3.89E-03	3.00E-04		6.66E+00	1.30E+01
CADMIUM	1.87E-06	3.46E-06		ND	-	-	4.37E-06	8.06E-06	1.00E-03		4.37E-03	8.06E-03
CHROMIUM	5.44E-05	7.83E-05		ND	-	-	1.27E-04	1.83E-04	5.00E-03		2.54E-02	3.65E-02
COPPER	1.70E-03	1.85E-03		ND	-	-	3.98E-03	4.33E-03	3.70E-02		1.07E-01	1.17E-01
IRON	5.09E-03	1.74E-02		ND	-	-	1.19E-02	4.06E-02		ND	-	-
LEAD	1.27E-05	3.68E-05		ND	-	-	2.97E-05	8.58E-05		ND	-	-
MANGANESE	2.18E-04	3.37E-04		ND	-	-	5.08E-04	7.87E-04	1.00E-01		5.08E-03	7.87E-03
MERCURY	8.61E-05	1.11E-04		ND	-	-	2.01E-04	2.58E-04	3.00E-04		6.70E-01	8.60E-01
NICKEL	3.75E-05	8.13E-05		ND	-	-	8.74E-05	1.90E-04	2.00E-02		4.37E-03	9.48E-03
SILVER	4.57E-05	7.16E-05		ND	-	-	1.07E-04	1.67E-04	5.00E-03		2.13E-02	3.34E-02
ZINC	5.41E-03	6.34E-03		ND	-	-	1.26E-02	1.48E-02	2.00E-01		6.31E-02	7.40E-02
PESTICIDES												
ALDRIN	5.39E-08	1.13E-07	1.70E+01		9.16E-07	1.92E-06	1.26E-07	2.64E-07	3.00E-05		4.19E-03	8.80E-03
ALPHA-CHLORDANE	4.47E-08	7.28E-08	1.30E+00		5.81E-08	9.46E-08	1.04E-07	1.70E-07	6.00E-05		1.74E-03	2.83E-03
HEPTACHLOR	3.80E-08	4.88E-08	4.50E+00		1.71E-07	2.20E-07	8.88E-08	1.14E-07	5.00E-04		1.78E-04	2.28E-04
HEPTACHLOR EPOXIDE	5.50E-08	1.56E-07	9.10E+00		5.01E-07	1.42E-06	1.28E-07	3.65E-07	1.30E-05		9.88E-03	2.81E-02
HEXACHLOROBENZENE	1.33E-07	1.88E-07	1.60E+00		2.13E-07	3.01E-07	3.11E-07	4.39E-07	8.00E-04		3.88E-04	5.49E-04
LINDANE (GAMMA-BHC)	5.00E-08	1.44E-07	1.30E+00		6.50E-08	1.87E-07	1.17E-07	3.35E-07	3.00E-04		3.89E-04	1.12E-03
MIREX	3.99E-08	4.88E-08	1.80E+00		7.17E-08	8.79E-08	9.30E-08	1.14E-07	2.00E-04		4.65E-04	5.70E-04
TRANS-NONACHLOR	5.07E-08	8.10E-08		ND	-	-	1.18E-07	1.89E-07		ND	-	-
o,p'-DDD	5.42E-08	1.10E-07		ND	-	-	1.27E-07	2.56E-07		ND	-	-
o,p'-DDE	4.12E-08	4.88E-08		ND	-	-	9.62E-08	1.14E-07		ND	-	-
o,p'-DDT	4.12E-08	4.88E-08		ND	-	-	9.62E-08	1.14E-07		ND	-	-
p,p'-DDD	6.02E-08	1.07E-07	2.40E-01		1.45E-08	2.57E-08	1.41E-07	2.50E-07		ND	-	-
p,p'-DDE	2.35E-07	4.26E-07	3.40E-01		7.98E-08	1.45E-07	5.47E-07	9.94E-07		ND	-	-
p,p'-DDT	1.59E-07	6.87E-07	3.40E-01		5.39E-08	2.34E-07	3.70E-07	1.60E-06	5.00E-04		7.40E-04	3.21E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-1
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	4.89E-06	2.60E-05		ND	-	-	1.14E-05	6.08E-05	3.00E-01		3.80E-05	2.03E-04
BENZO(A)ANTHRACENE	1.15E-05	4.96E-05	5.80E+00		6.69E-05	2.87E-04	2.69E-05	1.16E-04		ND	-	-
BENZO(A)PYRENE	1.23E-05	5.04E-05	5.80E+00		7.16E-05	2.92E-04	2.88E-05	1.18E-04		ND	-	-
BENZO(E)PYRENE	1.54E-05	5.71E-05		ND	-	-	3.60E-05	1.33E-04		ND	-	-
BENZO(G,H,I)PERYLENE	3.40E-06	1.08E-05		ND	-	-	7.92E-06	2.53E-05	4.00E-03		1.98E-03	6.32E-03
CHRYSENE	1.98E-05	8.82E-05	5.80E+00		1.15E-04	5.12E-04	4.63E-05	2.06E-04		ND	-	-
FLUORANTHENE	6.08E-05	2.69E-04		ND	-	-	1.42E-04	6.27E-04	4.00E-02		3.55E-03	1.57E-02
FLUORENE	4.65E-06	2.18E-05		ND	-	-	1.09E-05	5.10E-05	4.00E-02		2.71E-04	1.27E-03
INDENO(1,2,3-CD)PYRENE	3.32E-06	1.10E-05	5.80E+00		1.93E-05	6.38E-05	7.75E-06	2.57E-05		ND	-	-
PERYLENE	5.41E-06	1.76E-05		ND	-	-	1.26E-05	4.12E-05		ND	-	-
PHENANTHRENE	2.07E-05	1.06E-04		ND	-	-	4.82E-05	2.47E-04	4.00E-03		1.21E-02	6.17E-02
PYRENE	5.09E-05	2.18E-04		ND	-	-	1.19E-04	5.10E-04	3.00E-02		3.96E-03	1.70E-02
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.25E-06	7.67E-06	7.70E+00		3.27E-05	5.91E-05	9.92E-06	1.79E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.81E-03	4.14E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				7.60E+00	1.43E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-2
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	2.46E-03	3.82E-03		ND	-	-	5.75E-03	8.92E-03	2.90E+00		1.98E-03	3.08E-03
ARSENIC	4.12E-04	5.77E-04	1.75E+00		7.21E-04	1.01E-03	9.62E-04	1.35E-03	3.00E-04		3.21E+00	4.49E+00
CADMIUM	2.10E-06	3.46E-06		ND	-	-	4.90E-06	8.06E-06	1.00E-03		4.90E-03	8.06E-03
CHROMIUM	5.92E-05	5.98E-05		ND	-	-	1.38E-04	1.40E-04	5.00E-03		2.76E-02	2.79E-02
COPPER	1.71E-03	1.85E-03		ND	-	-	4.00E-03	4.33E-03	3.70E-02		1.08E-01	1.17E-01
IRON	4.83E-03	6.70E-03		ND	-	-	1.13E-02	1.56E-02		ND	-	-
LEAD	1.32E-05	1.39E-05		ND	-	-	3.07E-05	3.25E-05		ND	-	-
MANGANESE	2.65E-04	3.37E-04		ND	-	-	6.17E-04	7.87E-04	1.00E-01		6.17E-03	7.87E-03
MERCURY	7.36E-05	7.36E-05		ND	-	-	1.72E-04	1.72E-04	3.00E-04		5.73E-01	5.73E-01
NICKEL	6.51E-05	8.13E-05		ND	-	-	1.52E-04	1.90E-04	2.00E-02		7.59E-03	9.48E-03
SILVER	5.03E-05	7.16E-05		ND	-	-	1.17E-04	1.67E-04	5.00E-03		2.35E-02	3.34E-02
ZINC	4.76E-03	5.04E-03		ND	-	-	1.11E-02	1.18E-02	2.00E-01		5.56E-02	5.88E-02
PESTICIDES												
ALDRIN	8.94E-08	1.49E-07	1.70E+01		1.52E-06	2.53E-06	2.09E-07	3.48E-07	3.00E-05		6.95E-03	1.16E-02
ALPHA-CHLORDANE	3.04E-08	4.60E-08	1.30E+00		3.96E-08	5.98E-08	7.10E-08	1.07E-07	6.00E-05		1.18E-03	1.79E-03
HEPTACHLOR	2.38E-08	4.63E-08	4.50E+00		1.07E-07	2.08E-07	5.55E-08	1.08E-07	5.00E-04		1.11E-04	2.16E-04
HEPTACHLOR EPOXIDE	3.52E-08	6.40E-08	9.10E+00		3.20E-07	5.83E-07	8.21E-08	1.49E-07	1.30E-05		6.32E-03	1.15E-02
HEXACHLOROBENZENE	4.95E-08	6.12E-08	1.60E+00		7.91E-08	9.79E-08	1.15E-07	1.43E-07	8.00E-04		1.44E-04	1.78E-04
LINDANE (GAMMA-BHC)	2.63E-08	2.98E-08	1.30E+00		3.42E-08	3.87E-08	6.14E-08	6.95E-08	3.00E-04		2.05E-04	2.32E-04
MIREX	3.87E-08	4.63E-08	1.80E+00		6.96E-08	8.33E-08	9.02E-08	1.08E-07	2.00E-04		4.51E-04	5.40E-04
TRANS-NONACHLOR	5.01E-08	5.67E-08		ND	-	-	1.17E-07	1.32E-07		ND	-	-
o,p'-DDD	4.09E-08	4.63E-08		ND	-	-	9.54E-08	1.08E-07		ND	-	-
o,p'-DDE	4.09E-08	4.63E-08		ND	-	-	9.54E-08	1.08E-07		ND	-	-
o,p'-DDT	4.09E-08	4.63E-08		ND	-	-	9.54E-08	1.08E-07		ND	-	-
p,p'-DDD	5.14E-08	5.67E-08	2.40E-01		1.23E-08	1.36E-08	1.20E-07	1.32E-07		ND	-	-
p,p'-DDE	1.33E-07	1.77E-07	3.40E-01		4.51E-08	6.00E-08	3.09E-07	4.12E-07		ND	-	-
p,p'-DDT	6.09E-08	7.55E-08	3.40E-01		2.07E-08	2.57E-08	1.42E-07	1.76E-07	5.00E-04		2.84E-04	3.52E-04

NOTES:
ND - NO DATA AVAILABLE

TABLE 5-2
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	1.34E-05	2.60E-05		ND	-	-	3.12E-05	6.08E-05	3.00E-01		1.04E-04	2.03E-04
BENZO(A)ANTHRACENE	3.04E-05	4.96E-05	5.80E+00		1.77E-04	2.87E-04	7.10E-05	1.16E-04		ND	-	-
BENZO(A)PYRENE	3.12E-05	5.04E-05	5.80E+00		1.81E-04	2.92E-04	7.27E-05	1.18E-04		ND	-	-
BENZO(E)PYRENE	3.60E-05	5.71E-05		ND	-	-	8.40E-05	1.33E-04		ND	-	-
BENZO(G,H,I)PERYLENE	7.21E-06	1.08E-05		ND	-	-	1.68E-05	2.53E-05	4.00E-03		4.20E-03	6.32E-03
CHRYSENE	5.23E-05	8.82E-05	5.80E+00		3.03E-04	5.12E-04	1.22E-04	2.06E-04		ND	-	-
FLUORANTHENE	1.57E-04	2.69E-04		ND	-	-	3.66E-04	6.27E-04	4.00E-02		9.14E-03	1.57E-02
FLUORENE	1.11E-05	2.18E-05		ND	-	-	2.59E-05	5.10E-05	4.00E-02		6.48E-04	1.27E-03
INDENO(1,2,3-CD)PYRENE	7.44E-06	1.10E-05	5.80E+00		4.32E-05	6.38E-05	1.74E-05	2.57E-05		ND	-	-
PERYLENE	1.20E-05	1.76E-05		ND	-	-	2.81E-05	4.12E-05		ND	-	-
PHENANTHRENE	5.64E-05	1.06E-04		ND	-	-	1.31E-04	2.47E-04	4.00E-03		3.29E-02	6.17E-02
PYRENE	1.27E-04	2.18E-04		ND	-	-	2.97E-04	5.10E-04	3.00E-02		9.89E-03	1.70E-02
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	2.73E-06	2.82E-06	7.70E+00		2.10E-05	2.17E-05	6.36E-06	6.58E-06		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.45E-03	2.19E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				4.09E+00	5.45E+00

NOTES:
ND - NO DATA AVAILABLE

TABLE 5-3
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
INORGANICS										
ALUMINUM	7.02E-04	8.03E-04	ND	-	-	1.64E-03	1.87E-03	2.90E+00	5.65E-04	6.46E-04
ARSENIC	1.24E-03	1.67E-03	1.75E+00	2.17E-03	2.92E-03	2.89E-03	3.89E-03	3.00E-04	9.63E+00	1.30E+01
CADMIUM	1.97E-06	1.97E-06	ND	-	-	4.59E-06	4.59E-06	1.00E-03	4.59E-03	4.59E-03
CHROMIUM	4.43E-05	4.57E-05	ND	-	-	1.03E-04	1.07E-04	5.00E-03	2.07E-02	2.13E-02
COPPER	1.83E-03	1.85E-03	ND	-	-	4.27E-03	4.33E-03	3.70E-02	1.15E-01	1.17E-01
IRON	1.10E-03	1.50E-03	ND	-	-	2.57E-03	3.49E-03	ND	-	-
LEAD	5.23E-06	6.66E-06	ND	-	-	1.22E-05	1.55E-05	ND	-	-
MANGANESE	1.71E-04	2.37E-04	ND	-	-	3.99E-04	5.54E-04	1.00E-01	3.99E-03	5.54E-03
MERCURY	9.51E-05	9.80E-05	ND	-	-	2.22E-04	2.29E-04	3.00E-04	7.40E-01	7.62E-01
NICKEL	1.33E-05	2.11E-05	ND	-	-	3.11E-05	4.93E-05	2.00E-02	1.56E-03	2.46E-03
SILVER	3.32E-05	4.48E-05	ND	-	-	7.74E-05	1.05E-04	5.00E-03	1.55E-02	2.09E-02
ZINC	6.20E-03	6.34E-03	ND	-	-	1.45E-02	1.48E-02	2.00E-01	7.23E-02	7.40E-02
PESTICIDES										
ALDRIN	4.66E-08	4.66E-08 *	1.70E+01	7.92E-07	7.92E-07	1.09E-07	1.09E-07 *	3.00E-05	3.62E-03	3.62E-03
ALPHA-CHLORDANE	4.66E-08	4.66E-08 *	1.30E+00	6.06E-08	6.06E-08	1.09E-07	1.09E-07 *	6.00E-05	1.81E-03	1.81E-03
HEPTACHLOR	4.66E-08	4.66E-08 *	4.50E+00	2.10E-07	2.10E-07	1.09E-07	1.09E-07 *	5.00E-04	2.17E-04	2.17E-04
HEPTACHLOR EPOXIDE	9.99E-08	1.53E-07	9.10E+00	9.09E-07	1.39E-06	2.33E-07	3.57E-07	1.30E-05	1.79E-02	2.75E-02
HEXACHLOROBENZENE	1.86E-07	1.86E-07 *	1.60E+00	2.98E-07	2.98E-07	4.35E-07	4.35E-07 *	8.00E-04	5.44E-04	5.44E-04
LINDANE (GAMMA-BHC)	4.66E-08	4.66E-08 *	1.30E+00	6.06E-08	6.06E-08	1.09E-07	1.09E-07 *	3.00E-04	3.62E-04	3.62E-04
MIREX	4.66E-08	4.66E-08 *	1.80E+00	8.39E-08	8.39E-08	1.09E-07	1.09E-07 *	2.00E-04	5.44E-04	5.44E-04
TRANS-NONACHLOR	4.66E-08	4.66E-08 *	ND	-	-	1.09E-07	1.09E-07 *	ND	-	-
o,p'-DDD	7.82E-08	1.10E-07	ND	-	-	1.83E-07	2.56E-07	ND	-	-
o,p'-DDE	4.66E-08	4.66E-08 *	ND	-	-	1.09E-07	1.09E-07 *	ND	-	-
o,p'-DDT	4.66E-08	4.66E-08 *	ND	-	-	1.09E-07	1.09E-07 *	ND	-	-
p,p'-DDD	4.66E-08	4.66E-08 *	2.40E-01	1.12E-08	1.12E-08	1.09E-07	1.09E-07 *	ND	-	-
p,p'-DDE	3.73E-07	4.26E-07	3.40E-01	1.27E-07	1.45E-07	8.70E-07	9.94E-07	ND	-	-
p,p'-DDT	4.66E-08	4.66E-08 *	3.40E-01	1.58E-08	1.58E-08	1.09E-07	1.09E-07 *	5.00E-04	2.17E-04	2.17E-04

NOTES:

ND : NO DATA AVAILABLE

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-3
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
BENZO(A)PYRENE	9.32E-07	1.26E-06	5.80E+00		5.41E-06	7.34E-06	2.17E-06	2.95E-06		ND	-	-
FLUORANTHENE	1.78E-06	2.96E-06		ND	-	-	4.16E-06	6.91E-06	4.00E-02		1.04E-04	1.73E-04
PHENANTHRENE	6.32E-07	8.65E-07		ND	-	-	1.48E-06	2.02E-06	4.00E-03		3.69E-04	5.05E-04
PYRENE	1.30E-06	2.00E-06		ND	-	-	3.03E-06	4.66E-06	3.00E-02		1.01E-04	1.55E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	5.57E-06	7.66E-06	7.70E+00		4.29E-05	5.90E-05	1.30E-05	1.79E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					2.22E-03	2.99E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.06E+01	1.40E+01

NOTES:

ND : NO DATA AVAILABLE

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-4
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	3.24E-03	5.80E-03		ND	-	-	7.55E-03	1.35E-02	2.90E+00		2.60E-03	4.67E-03
ARSENIC	9.18E-04	9.26E-04	1.75E+00		1.61E-03	1.62E-03	2.14E-03	2.16E-03	3.00E-04		7.14E+00	7.20E+00
CADMIUM	1.55E-06	2.41E-06		ND	-	-	3.62E-06	5.62E-06	1.00E-03		3.62E-03	5.62E-03
CHROMIUM	5.99E-05	7.83E-05		ND	-	-	1.40E-04	1.83E-04	5.00E-03		2.79E-02	3.65E-02
COPPER	1.57E-03	1.83E-03		ND	-	-	3.65E-03	4.27E-03	3.70E-02		9.88E-02	1.15E-01
IRON	9.33E-03	1.74E-02		ND	-	-	2.18E-02	4.06E-02		ND	-	-
LEAD	1.98E-05	3.68E-05		ND	-	-	4.62E-05	8.58E-05		ND	-	-
MANGANESE	2.17E-04	2.41E-04		ND	-	-	5.07E-04	5.62E-04	1.00E-01		5.07E-03	5.62E-03
MERCURY	8.33E-05	1.11E-04		ND	-	-	1.94E-04	2.58E-04	3.00E-04		6.48E-01	8.60E-01
NICKEL	3.40E-05	5.48E-05		ND	-	-	7.93E-05	1.28E-04	2.00E-02		3.96E-03	6.39E-03
SILVER	5.37E-05	5.48E-05		ND	-	-	1.25E-04	1.28E-04	5.00E-03		2.50E-02	2.56E-02
ZINC	5.25E-03	5.81E-03		ND	-	-	1.23E-02	1.35E-02	2.00E-01		6.13E-02	6.77E-02
PESTICIDES												
ALDRIN	3.65E-08	4.88E-08	1.70E+01		6.20E-07	8.30E-07	8.51E-08	1.14E-07	3.00E-05		2.84E-03	3.80E-03
ALPHA-CHLORDANE	5.15E-08	7.28E-08	1.30E+00		6.70E-08	9.46E-08	1.20E-07	1.70E-07	6.00E-05		2.00E-03	2.83E-03
HEPTACHLOR	4.00E-08	4.88E-08	4.50E+00		1.80E-07	2.20E-07	9.32E-08	1.14E-07	5.00E-04		1.86E-04	2.28E-04
HEPTACHLOR EPOXIDE	3.87E-08	5.16E-08	9.10E+00		3.52E-07	4.70E-07	9.04E-08	1.20E-07	1.30E-05		6.95E-03	9.26E-03
HEXACHLOROBENZENE	1.52E-07	1.88E-07	1.60E+00		2.43E-07	3.01E-07	3.54E-07	4.39E-07	8.00E-04		4.42E-04	5.49E-04
LINDANE (GAMMA-BHC)	7.13E-08	1.44E-07	1.30E+00		9.27E-08	1.87E-07	1.66E-07	3.35E-07	3.00E-04		5.55E-04	1.12E-03
MIREX	4.00E-08	4.88E-08	1.80E+00		7.19E-08	8.79E-08	9.32E-08	1.14E-07	2.00E-04		4.66E-04	5.70E-04
TRANS-NONACHLOR	5.57E-08	8.10E-08		ND	-	-	1.30E-07	1.89E-07		ND	-	-
o,p'-DDD	4.69E-08	4.88E-08		ND	-	-	1.09E-07	1.14E-07		ND	-	-
o,p'-DDE	3.77E-08	4.88E-08		ND	-	-	8.79E-08	1.14E-07		ND	-	-
o,p'-DDT	3.77E-08	4.88E-08		ND	-	-	8.79E-08	1.14E-07		ND	-	-
p,p'-DDD	7.32E-08	1.07E-07	2.40E-01		1.76E-08	2.57E-08	1.71E-07	2.50E-07		ND	-	-
p,p'-DDE	2.09E-07	2.67E-07	3.40E-01		7.11E-08	9.09E-08	4.88E-07	6.24E-07		ND	-	-
p,p'-DDT	2.98E-07	6.87E-07	3.40E-01		1.01E-07	2.34E-07	6.96E-07	1.60E-06	5.00E-04		1.39E-03	3.21E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-4
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	2.20E-06	4.93E-06		ND	-	-	5.14E-06	1.15E-05	3.00E-01		1.71E-05	3.83E-05
BENZO(A)ANTHRACENE	6.28E-06	1.17E-05	5.80E+00		3.64E-05	6.80E-05	1.47E-05	2.73E-05		ND	-	-
BENZO(A)PYRENE	7.40E-06	1.33E-05	5.80E+00		4.29E-05	7.72E-05	1.73E-05	3.11E-05		ND	-	-
BENZO(E)PYRENE	1.15E-05	1.86E-05		ND			2.68E-05	4.35E-05		ND	-	-
BENZO(G,H,I)PERYLENE	2.68E-06	4.26E-06		ND			6.26E-06	9.94E-06	4.00E-03		1.56E-03	2.49E-03
CHRYSENE	1.11E-05	1.73E-05	5.80E+00		6.41E-05	1.00E-04	2.58E-05	4.04E-05		ND	-	-
FLUORANTHENE	3.62E-05	6.39E-05		ND	-	-	8.45E-05	1.49E-04	4.00E-02		2.11E-03	3.73E-03
FLUORENE	3.30E-06	6.39E-06		ND	-	-	7.70E-06	1.49E-05	4.00E-02		1.93E-04	3.73E-04
INDENO(1,2,3-CD)PYRENE	2.47E-06	4.13E-06	5.80E+00		1.43E-05	2.39E-05	5.77E-06	9.63E-06		ND	-	-
PERYLENE	4.32E-06	6.66E-06		ND	-	-	1.01E-05	1.55E-05		ND	-	-
PHENANTHRENE	1.02E-05	1.73E-05		ND	-	-	2.38E-05	4.04E-05	4.00E-03		5.96E-03	1.01E-02
PYRENE	3.31E-05	6.52E-05		ND	-	-	7.72E-05	1.52E-04	3.00E-02		2.57E-03	5.07E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.41E-06	5.77E-06	7.70E+00		3.39E-05	4.44E-05	1.03E-05	1.35E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.80E-03	1.94E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				8.04E+00	8.37E+00

NOTES:

ND – NO DATA AVAILABLE

TABLE 5-5
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
PESTICIDES										
ALDRIN	2.63E-08	2.63E-08 *	1.70E+01	4.47E-07	4.47E-07	6.14E-08	6.14E-08 *	3.00E-05	2.05E-03	2.05E-03
ALPHA-CHLORDANE	8.08E-08	8.08E-08 *	1.30E+00	1.05E-07	1.05E-07	1.89E-07	1.89E-07 *	6.00E-05	3.14E-03	3.14E-03
HEPTACHLOR	4.63E-08	4.63E-08 *	4.50E+00	2.08E-07	2.08E-07	1.08E-07	1.08E-07 *	5.00E-04	2.16E-04	2.16E-04
HEPTACHLOR EPOXIDE	7.55E-08	7.55E-08 *	9.10E+00	6.87E-07	6.87E-07	1.76E-07	1.76E-07 *	1.30E-05	1.35E-02	1.35E-02
HEXACHLOROBENZENE	4.50E-08	4.50E-08 *	1.60E+00	7.20E-08	7.20E-08	1.05E-07	1.05E-07 *	8.00E-04	1.31E-04	1.31E-04
LINDANE (GAMMA-BHC)	2.38E-08	2.38E-08 *	1.30E+00	3.09E-08	3.09E-08	5.55E-08	5.55E-08 *	3.00E-04	1.85E-04	1.85E-04
MIREX	4.63E-08	4.63E-08 *	1.80E+00	8.33E-08	8.33E-08	1.08E-07	1.08E-07 *	2.00E-04	5.40E-04	5.40E-04
TRANS-NONACHLOR	4.15E-08	4.15E-08 *	ND	-	-	9.69E-08	9.69E-08 *	ND	-	-
o,p'-DDD	4.63E-08	4.63E-08 *	ND	-	-	1.08E-07	1.08E-07 *	ND	-	-
o,p'-DDE	4.63E-08	4.63E-08 *	ND	-	-	1.08E-07	1.08E-07 *	ND	-	-
o,p'-DDT	4.63E-08	4.63E-08 *	ND	-	-	1.08E-07	1.08E-07 *	ND	-	-
p,p'-DDD	1.25E-07	1.25E-07 *	2.40E-01	3.00E-08	3.00E-08	2.91E-07	2.91E-07 *	ND	-	-
p,p'-DDE	2.57E-07	2.57E-07 *	3.40E-01	8.73E-08	8.73E-08	5.99E-07	5.99E-07 *	ND	-	-
p,p'-DDT	6.02E-08	6.02E-08 *	3.40E-01	2.05E-08	2.05E-08	1.41E-07	1.41E-07 *	5.00E-04	2.81E-04	2.81E-04
POLYCHLORINATED BIPHENYLS (PCBs)										
TOTAL PCBs (AROCHLOR)	4.09E-06	4.09E-06 *	7.70E+00	3.15E-05	3.15E-05	9.54E-06	9.54E-06 *	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				3.33E-05	3.33E-05	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			2.01E-02	2.01E-02

NOTES:

ND : NO DATA AVAILABLE

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-6
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
INORGANICS												
ALUMINUM	5.21E-03	1.42E-02		ND	-	-	1.22E-02	3.31E-02	2.90E+00		4.20E-03	1.14E-02
ARSENIC	2.09E-03	4.08E-03	1.75E+00		3.66E-03	7.13E-03	4.88E-03	9.51E-03	3.00E-04		1.63E+01	3.17E+01
CADMIUM	4.58E-06	8.45E-06		ND	-	-	1.07E-05	1.97E-05	1.00E-03		1.07E-02	1.97E-02
CHROMIUM	1.33E-04	1.91E-04		ND	-	-	3.11E-04	4.47E-04	5.00E-03		6.21E-02	8.93E-02
COPPER	4.17E-03	4.53E-03		ND	-	-	9.72E-03	1.06E-02	3.70E-02		2.63E-01	2.86E-01
IRON	1.24E-02	4.26E-02		ND	-	-	2.90E-02	9.93E-02		ND	-	-
LEAD	3.11E-05	8.99E-05		ND	-	-	7.26E-05	2.10E-04		ND	-	-
MANGANESE	5.32E-04	8.24E-04		ND	-	-	1.24E-03	1.92E-03	1.00E-01		1.24E-02	1.92E-02
MERCURY	2.10E-04	2.70E-04		ND	-	-	4.91E-04	6.31E-04	3.00E-04		1.64E+00	2.10E+00
NICKEL	9.15E-05	1.99E-04		ND	-	-	2.14E-04	4.63E-04	2.00E-02		1.07E-02	2.32E-02
SILVER	1.12E-04	1.75E-04		ND	-	-	2.61E-04	4.09E-04	5.00E-03		5.21E-02	8.17E-02
ZINC	1.32E-02	1.55E-02		ND	-	-	3.08E-02	3.62E-02	2.00E-01		1.54E-01	1.81E-01
PESTICIDES												
ALDRIN	1.32E-07	3.64E-07	1.70E+01		2.24E-06	6.19E-06	3.07E-07	8.50E-07	3.00E-05		1.02E-02	2.83E-02
ALPHA-CHLORDANE	1.09E-07	1.78E-07	1.30E+00		1.42E-07	2.31E-07	2.55E-07	4.15E-07	6.00E-05		4.25E-03	6.92E-03
HEPTACHLOR	9.30E-08	1.19E-07	4.50E+00		4.18E-07	5.37E-07	2.17E-07	2.78E-07	5.00E-04		4.34E-04	5.57E-04
HEPTACHLOR EPOXIDE	1.35E-07	3.72E-07	9.10E+00		1.22E-06	3.38E-06	3.14E-07	8.68E-07	1.30E-05		2.41E-02	6.68E-02
HEXACHLOROBENZENE	3.25E-07	4.60E-07	1.60E+00		5.21E-07	7.37E-07	7.59E-07	1.07E-06	8.00E-04		9.49E-04	1.34E-03
LINDANE (GAMMA-BHC)	1.22E-07	3.51E-07	1.30E+00		1.59E-07	4.57E-07	2.85E-07	8.20E-07	3.00E-04		9.51E-04	2.73E-03
MIREX	9.74E-08	1.19E-07	1.80E+00		1.75E-07	2.15E-07	2.27E-07	2.78E-07	2.00E-04		1.14E-03	1.39E-03
TRANS-NONACHLOR	1.24E-07	1.98E-07		ND	-	-	2.89E-07	4.62E-07		ND	-	-
o,p'-DDD	1.33E-07	2.69E-07		ND	-	-	3.09E-07	6.27E-07		ND	-	-
o,p'-DDE	1.01E-07	1.19E-07		ND	-	-	2.35E-07	2.78E-07		ND	-	-
o,p'-DDT	1.01E-07	1.19E-07		ND	-	-	2.35E-07	2.78E-07		ND	-	-
p,p'-DDD	1.47E-07	2.62E-07	2.40E-01		3.53E-08	6.29E-08	3.44E-07	6.12E-07		ND	-	-
p,p'-DDE	5.73E-07	1.04E-06	3.40E-01		1.95E-07	3.54E-07	1.34E-06	2.43E-06		ND	-	-
p,p'-DDT	3.87E-07	1.68E-06	3.40E-01		1.32E-07	5.71E-07	9.04E-07	3.92E-06	5.00E-04		1.81E-03	7.84E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-6
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	1.20E-05	6.37E-05		ND	-	-	2.79E-05	1.49E-04	3.00E-01		9.30E-05	4.95E-04
BENZO(A)ANTHRACENE	2.82E-05	1.21E-04	5.80E+00		1.63E-04	7.03E-04	6.58E-05	2.83E-04		ND	-	-
BENZO(A)PYRENE	3.02E-05	1.23E-04	5.80E+00		1.75E-04	7.15E-04	7.04E-05	2.88E-04		ND	-	-
BENZO(E)PYRENE	3.77E-05	1.40E-04		ND	-	-	8.79E-05	3.26E-04		ND	-	-
BENZO(G,H,I)PERYLENE	8.30E-06	2.65E-05		ND	-	-	1.94E-05	6.18E-05	4.00E-03		4.84E-03	1.55E-02
CHRYSENE	4.85E-05	2.16E-04	5.80E+00		2.81E-04	1.25E-03	1.13E-04	5.03E-04		ND	-	-
FLUORANTHENE	1.49E-04	6.57E-04		ND	-	-	3.47E-04	1.53E-03	4.00E-02		8.67E-03	3.83E-02
FLUORENE	1.14E-05	5.34E-05		ND	-	-	2.65E-05	1.25E-04	4.00E-02		6.63E-04	3.11E-03
INDENO(1,2,3-CD)PYRENE	8.12E-06	2.69E-05	5.80E+00		4.71E-05	1.56E-04	1.89E-05	6.28E-05		ND	-	-
PERYLENE	1.32E-05	4.31E-05		ND	-	-	3.09E-05	1.01E-04		ND	-	-
PHENANTHRENE	5.05E-05	2.59E-04		ND	-	-	1.18E-04	6.04E-04	4.00E-03		2.95E-02	1.51E-01
PYRENE	1.24E-04	5.34E-04		ND	-	-	2.90E-04	1.25E-03	3.00E-02		9.67E-03	4.15E-02
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	1.04E-05	1.88E-05	7.70E+00		8.00E-05	1.44E-04	2.42E-05	4.38E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					4.41E-03	1.01E-02	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.86E+01	3.49E+01

NOTES:

ND – NO DATA AVAILABLE

TABLE 5-7
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	1.81E-02	2.81E-02		ND	-	-	4.23E-02	6.57E-02	2.90E+00		1.46E-02	2.26E-02
ARSENIC	3.03E-03	4.25E-03	1.75E+00		5.31E-03	7.43E-03	7.08E-03	9.91E-03	3.00E-04		2.36E+01	3.30E+01
CADMIUM	1.55E-05	2.54E-05		ND	-	-	3.61E-05	5.93E-05	1.00E-03		3.61E-02	5.93E-02
CHROMIUM	4.35E-04	4.40E-04		ND	-	-	1.02E-03	1.03E-03	5.00E-03		2.03E-01	2.05E-01
COPPER	1.26E-02	1.36E-02		ND	-	-	2.94E-02	3.18E-02	3.70E-02		7.96E-01	8.60E-01
IRON	3.55E-02	4.93E-02		ND	-	-	8.29E-02	1.15E-01		ND	-	-
LEAD	9.68E-05	1.03E-04		ND	-	-	2.26E-04	2.39E-04		ND	-	-
MANGANESE	1.95E-03	2.48E-03		ND	-	-	4.54E-03	5.79E-03	1.00E-01		4.54E-02	5.79E-02
MERCURY	5.42E-04	5.42E-04 *		ND	-	-	1.26E-03	1.26E-03	3.00E-04		4.21E+00	4.21E+00
NICKEL	4.79E-04	5.98E-04		ND	-	-	1.12E-03	1.40E-03	2.00E-02		5.58E-02	6.98E-02
SILVER	3.70E-04	5.27E-04		ND	-	-	8.63E-04	1.23E-03	5.00E-03		1.73E-01	2.46E-01
ZINC	3.50E-02	3.71E-02		ND	-	-	8.17E-02	8.65E-02	2.00E-01		4.09E-01	4.32E-01
PESTICIDES												
ALDRIN	6.58E-07	1.10E-06	1.70E+01		1.12E-05	1.86E-05	1.53E-06	2.56E-06	3.00E-05		5.12E-02	8.53E-02
ALPHA-CHLORDANE	2.24E-07	3.38E-07	1.30E+00		2.91E-07	4.40E-07	5.23E-07	7.89E-07	6.00E-05		8.71E-03	1.32E-02
HEPTACHLOR	1.75E-07	3.41E-07	4.50E+00		7.87E-07	1.53E-06	4.08E-07	7.95E-07	5.00E-04		8.16E-04	1.59E-03
HEPTACHLOR EPOXIDE	2.59E-07	4.71E-07	9.10E+00		2.36E-06	4.29E-06	6.04E-07	1.10E-06	1.30E-05		4.65E-02	8.46E-02
HEXACHLOROBENZENE	3.64E-07	4.50E-07	1.60E+00		5.82E-07	7.20E-07	8.49E-07	1.05E-06	8.00E-04		1.06E-03	1.31E-03
LINDANE (GAMMA-BHC)	1.94E-07	2.19E-07	1.30E+00		2.52E-07	2.85E-07	4.52E-07	5.12E-07	3.00E-04		1.51E-03	1.71E-03
MIREX	2.85E-07	3.41E-07	1.80E+00		5.12E-07	6.13E-07	6.64E-07	7.95E-07	2.00E-04		3.32E-03	3.97E-03
TRANS-NONACHLOR	3.69E-07	4.18E-07		ND	-	-	8.60E-07	9.74E-07		ND	-	-
o,p'-DDD	3.01E-07	3.41E-07		ND	-	-	7.02E-07	7.95E-07		ND	-	-
o,p'-DDE	3.01E-07	3.41E-07		ND	-	-	7.02E-07	7.95E-07		ND	-	-
o,p'-DDT	3.01E-07	3.41E-07		ND	-	-	7.02E-07	7.95E-07		ND	-	-
p,p'-DDD	3.78E-07	4.18E-07	2.40E-01		9.07E-08	1.00E-07	8.82E-07	9.74E-07		ND	-	-
p,p'-DDE	9.75E-07	1.30E-06	3.40E-01		3.32E-07	4.42E-07	2.28E-06	3.03E-06		ND	-	-
p,p'-DDT	4.48E-07	5.55E-07	3.40E-01		1.52E-07	1.89E-07	1.05E-06	1.30E-06	5.00E-04		2.09E-03	2.59E-03

NOTES:
ND : NO DATA AVAILABLE
* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-7
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	9.83E-05	1.92E-04		ND	-	-	2.29E-04	4.47E-04	3.00E-01		7.64E-04	1.49E-03
BENZO(A)ANTHRACENE	2.24E-04	3.65E-04	5.80E+00		1.30E-03	2.12E-03	5.23E-04	8.51E-04		ND	-	-
BENZO(A)PYRENE	2.29E-04	3.71E-04	5.80E+00		1.33E-03	2.15E-03	5.35E-04	8.65E-04		ND	-	-
BENZO(E)PYRENE	2.65E-04	4.20E-04		ND	-	-	6.18E-04	9.81E-04		ND	-	-
BENZO(G,H,I)PERYLENE	5.30E-05	7.97E-05		ND	-	-	1.24E-04	1.86E-04	4.00E-03		3.09E-02	4.65E-02
CHRYSENE	3.85E-04	6.49E-04	5.80E+00		2.23E-03	3.76E-03	8.98E-04	1.51E-03		ND	-	-
FLUORANTHENE	1.15E-03	1.98E-03		ND	-	-	2.69E-03	4.62E-03	4.00E-02		6.73E-02	1.15E-01
FLUORENE	8.17E-05	1.61E-04		ND	-	-	1.91E-04	3.75E-04	4.00E-02		4.77E-03	9.38E-03
INDENO(1,2,3-CD)PYRENE	5.47E-05	8.10E-05	5.80E+00		3.18E-04	4.70E-04	1.28E-04	1.89E-04		ND	-	-
PERYLENE	8.85E-05	1.30E-04		ND	-	-	2.06E-04	3.03E-04		ND	-	-
PHENANTHRENE	4.15E-04	7.79E-04		ND	-	-	9.68E-04	1.82E-03	4.00E-03		2.42E-01	4.54E-01
PYRENE	9.35E-04	1.61E-03		ND	-	-	2.18E-03	3.75E-03	3.00E-02		7.27E-02	1.25E-01
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	2.73E-06	2.82E-06	7.70E+00		2.10E-05	2.17E-05	6.36E-06	6.58E-06*		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.05E-02	1.60E-02	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				3.01E+01	4.01E+01

NOTES:

ND : NO DATA AVAILABLE
* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-8
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	5.16E-03	5.91E-03		ND	–	–	1.20E-02	1.38E-02	2.90E+00		4.15E-03	4.76E-03
ARSENIC	9.11E-03	1.23E-02	1.75E+00		1.59E-02	2.15E-02	2.13E-02	2.86E-02	3.00E-04		7.08E+01	9.54E+01
CADMIUM	1.45E-05	1.45E-05		ND	–	–	3.37E-05	3.37E-05	1.00E-03		3.37E-02	3.37E-02
CHROMIUM	3.26E-04	3.36E-04		ND	–	–	7.60E-04	7.85E-04	5.00E-03		1.52E-01	1.57E-01
COPPER	1.35E-02	1.36E-02		ND	–	–	3.14E-02	3.18E-02	3.70E-02		8.49E-01	8.61E-01
IRON	8.11E-03	1.10E-02		ND	–	–	1.89E-02	2.57E-02		ND	–	–
LEAD	3.85E-05	4.90E-05		ND	–	–	8.98E-05	1.14E-04		ND	–	–
MANGANESE	1.26E-03	1.75E-03		ND	–	–	2.93E-03	4.08E-03	1.00E-01		2.93E-02	4.08E-02
MERCURY	7.00E-04	7.21E-04		ND	–	–	1.63E-03	1.68E-03	3.00E-04		5.44E+00	5.61E+00
NICKEL	9.81E-05	1.55E-04		ND	–	–	2.29E-04	3.62E-04	2.00E-02		1.14E-02	1.81E-02
SILVER	2.44E-04	3.30E-04		ND	–	–	5.70E-04	7.70E-04	5.00E-03		1.14E-01	1.54E-01
ZINC	4.56E-02	4.67E-02		ND	–	–	1.06E-01	1.09E-01	2.00E-01		5.32E-01	5.45E-01
PESTICIDES												
ALDRIN	3.43E-07	3.43E-07 *	1.70E+01		5.83E-06	5.83E-06	8.00E-07	8.00E-07 *	3.00E-05		2.67E-02	2.67E-02
ALPHA-CHLORDANE	3.43E-07	3.43E-07 *	1.30E+00		4.46E-07	4.46E-07	8.00E-07	8.00E-07 *	6.00E-05		1.33E-02	1.33E-02
HEPTACHLOR	3.43E-07	3.43E-07 *	4.50E+00		1.54E-06	1.54E-06	8.00E-07	8.00E-07 *	5.00E-04		1.60E-03	1.60E-03
HEPTACHLOR EPOXIDE	7.35E-07	1.13E-06	9.10E+00		6.69E-06	1.03E-05	1.71E-06	2.63E-06	1.30E-05		1.32E-01	2.02E-01
HEXACHLOROBENZENE	1.37E-06	1.37E-06 *	1.60E+00		2.19E-06	2.19E-06	3.20E-06	3.20E-06 *	8.00E-04		4.00E-03	4.00E-03
LINDANE (GAMMA-BHC)	3.43E-07	3.43E-07 *	1.30E+00		4.46E-07	4.46E-07	8.00E-07	8.00E-07 *	3.00E-04		2.67E-03	2.67E-03
MIREX	3.43E-07	3.43E-07 *	1.80E+00		6.17E-07	6.17E-07	8.00E-07	8.00E-07 *	2.00E-04		4.00E-03	4.00E-03
TRANS-NONACHLOR	3.43E-07	3.43E-07 *		ND	–	–	8.00E-07	8.00E-07 *		ND	–	–
o,p'-DDD	5.76E-07	8.08E-07		ND	–	–	1.34E-06	1.89E-06		ND	–	–
o,p'-DDE	3.43E-07	3.43E-07 *		ND	–	–	8.00E-07	8.00E-07 *		ND	–	–
o,p'-DDT	3.43E-07	3.43E-07 *		ND	–	–	8.00E-07	8.00E-07 *		ND	–	–
p,p'-DDD	3.43E-07	3.43E-07 *	2.40E-01		8.23E-08	8.23E-08	8.00E-07	8.00E-07 *		ND	–	–
p,p'-DDE	2.74E-06	3.14E-06	3.40E-01		9.33E-07	1.07E-06	6.40E-06	7.32E-06		ND	–	–
p,p'-DDT	3.43E-07	3.43E-07 *	3.40E-01		1.17E-07	1.17E-07	8.00E-07	8.00E-07 *	5.00E-04		1.60E-03	1.60E-03

NOTES:

ND : NO DATA AVAILABLE

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-8
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
BENZO(A)PYRENE	6.86E-06	9.31E-06	5.80E+00		3.98E-05	5.40E-05	1.60E-05	2.17E-05		ND	-	-
FLUORANTHENE	1.31E-05	2.18E-05		ND	-	-	3.06E-05	5.09E-05	4.00E-02		7.64E-04	1.27E-03
PHENANTHRENE	4.65E-06	6.37E-06		ND	-	-	1.09E-05	1.49E-05	4.00E-03		2.71E-03	3.71E-03
PYRENE	9.55E-06	1.47E-05		ND	-	-	2.23E-05	3.43E-05	3.00E-02		7.43E-04	1.14E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.10E-05	5.64E-05	7.70E+00		3.15E-04	4.34E-04	9.56E-05	1.32E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.63E-02	2.20E-02	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				7.82E+01	1.03E+02

NOTES:
ND : NO DATA AVAILABLE
* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-9
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH
CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
INORGANICS												
ALUMINUM	2.38E-02	4.27E-02		ND	-	-	5.55E-02	9.96E-02	2.90E+00		1.92E-02	3.43E-02
ARSENIC	6.75E-03	6.81E-03	1.75E+00		1.18E-02	1.19E-02	1.58E-02	1.59E-02	3.00E-04		5.25E+01	5.30E+01
CADMIUM	1.14E-05	1.77E-05		ND	-	-	2.67E-05	4.14E-05	1.00E-03		2.67E-02	4.14E-02
CHROMIUM	4.41E-04	5.76E-04		ND	-	-	1.03E-03	1.34E-03	5.00E-03		2.06E-01	2.69E-01
COPPER	1.15E-02	1.35E-02		ND	-	-	2.69E-02	3.14E-02	3.70E-02		7.27E-01	8.50E-01
IRON	6.87E-02	1.28E-01		ND	-	-	1.60E-01	2.99E-01		ND	-	-
LEAD	1.46E-04	2.71E-04		ND	-	-	3.40E-04	6.31E-04		ND	-	-
MANGANESE	1.60E-03	1.77E-03		ND	-	-	3.73E-03	4.14E-03	1.00E-01		3.73E-02	4.14E-02
MERCURY	6.13E-04	8.14E-04		ND	-	-	1.43E-03	1.90E-03	3.00E-04		4.77E+00	6.33E+00
NICKEL	2.50E-04	4.03E-04		ND	-	-	5.83E-04	9.41E-04	2.00E-02		2.92E-02	4.71E-02
SILVER	3.95E-04	4.03E-04		ND	-	-	9.21E-04	9.41E-04	5.00E-03		1.84E-01	1.88E-01
ZINC	3.87E-02	4.27E-02		ND	-	-	9.02E-02	9.97E-02	2.00E-01		4.51E-01	4.98E-01
PESTICIDES												
ALDRIN	2.68E-07	3.59E-07	1.70E+01		4.56E-06	6.11E-06	6.26E-07	8.38E-07	3.00E-05		2.09E-02	2.79E-02
ALPHA-CHLORDANE	3.79E-07	5.35E-07	1.30E+00		4.93E-07	6.96E-07	8.84E-07	1.25E-06	6.00E-05		1.47E-02	2.08E-02
HEPTACHLOR	2.94E-07	3.59E-07	4.50E+00		1.32E-06	1.62E-06	6.86E-07	8.38E-07	5.00E-04		1.37E-03	1.68E-03
HEPTACHLOR EPOXIDE	2.85E-07	3.80E-07	9.10E+00		2.59E-06	3.46E-06	6.65E-07	8.86E-07	1.30E-05		5.11E-02	6.82E-02
HEXACHLOROBENZENE	1.12E-06	1.39E-06	1.60E+00		1.79E-06	2.22E-06	2.60E-06	3.23E-06	8.00E-04		3.26E-03	4.04E-03
LINDANE (GAMMA-BHC)	5.25E-07	1.06E-06	1.30E+00		6.82E-07	1.37E-06	1.22E-06	2.47E-06	3.00E-04		4.08E-03	8.23E-03
MIREX	2.94E-07	3.59E-07	1.80E+00		5.29E-07	6.47E-07	6.86E-07	8.38E-07	2.00E-04		3.43E-03	4.19E-03
TRANS-NONACHLOR	4.10E-07	5.96E-07		ND	-	-	9.57E-07	1.39E-06		ND	-	-
o,p'-DDD	3.45E-07	3.59E-07		ND	-	-	8.04E-07	8.38E-07		ND	-	-
o,p'-DDE	2.77E-07	3.59E-07		ND	-	-	6.47E-07	8.38E-07		ND	-	-
o,p'-DDT	2.77E-07	3.59E-07		ND	-	-	6.47E-07	8.38E-07		ND	-	-
p,p'-DDD	5.38E-07	7.89E-07	2.40E-01		1.29E-07	1.89E-07	1.26E-06	1.84E-06		ND	-	-
p,p'-DDE	1.54E-06	1.97E-06	3.40E-01		5.23E-07	6.69E-07	3.59E-06	4.59E-06		ND	-	-
p,p'-DDT	2.19E-06	5.06E-06	3.40E-01		7.46E-07	1.72E-06	5.12E-06	1.18E-05	5.00E-04		1.02E-02	2.36E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-9
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH
CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	1.62E-05	3.62E-05		ND	-	-	3.78E-05	8.46E-05	3.00E-01		1.26E-04	2.82E-04
BENZO(A)ANTHRACENE	4.62E-05	8.62E-05	5.80E+00		2.68E-04	5.00E-04	1.08E-04	2.01E-04		ND	-	-
BENZO(A)PYRENE	5.45E-05	9.80E-05	5.80E+00		3.16E-04	5.68E-04	1.27E-04	2.29E-04		ND	-	-
BENZO(E)PYRENE	8.46E-05	1.37E-04		ND			1.97E-04	3.20E-04		ND	-	-
BENZO(G,H,I)PERYLENE	1.97E-05	3.14E-05		ND			4.60E-05	7.32E-05	4.00E-03		1.15E-02	1.83E-02
CHRYSENE	8.13E-05	1.27E-04	5.80E+00		4.72E-04	7.39E-04	1.90E-04	2.97E-04		ND	-	-
FLUORANTHENE	2.67E-04	4.70E-04		ND	-	-	6.22E-04	1.10E-03	4.00E-02		1.56E-02	2.74E-02
FLUORENE	2.43E-05	4.70E-05		ND	-	-	5.67E-05	1.10E-04	4.00E-02		1.42E-03	2.74E-03
INDENO(1,2,3-CD)PYRENE	1.82E-05	3.04E-05	5.80E+00		1.05E-04	1.76E-04	4.24E-05	7.09E-05		ND	-	-
PERYLENE	3.18E-05	4.90E-05		ND	-	-	7.42E-05	1.14E-04		ND	-	-
PHENANTHRENE	7.51E-05	1.27E-04		ND	-	-	1.75E-04	2.97E-04	4.00E-03		4.38E-02	7.43E-02
PYRENE	2.43E-04	4.80E-04		ND	-	-	5.68E-04	1.12E-03	3.00E-02		1.89E-02	3.73E-02
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	3.24E-05	4.25E-05	7.70E+00		2.50E-04	3.27E-04	7.57E-05	9.91E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.32E-02	1.42E-02	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				5.92E+01	6.16E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-10
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
PESTICIDES										
ALDRIN	1.94E-07	1.94E-07 *	1.70E+01	3.29E-06	3.29E-06	4.52E-07	4.52E-07 *	3.00E-05	1.51E-02	1.51E-02
ALPHA-CHLORDANE	5.95E-07	5.95E-07 *	1.30E+00	7.73E-07	7.73E-07	1.39E-06	1.39E-06 *	6.00E-05	2.31E-02	2.31E-02
HEPTACHLOR	3.41E-07	3.41E-07 *	4.50E+00	1.53E-06	1.53E-06	7.95E-07	7.95E-07 *	5.00E-04	1.59E-03	1.59E-03
HEPTACHLOR EPOXIDE	5.55E-07	5.55E-07 *	9.10E+00	5.05E-06	5.05E-06	1.30E-06	1.30E-06 *	1.30E-05	9.96E-02	9.96E-02
HEXACHLOROBENZENE	3.31E-07	3.31E-07 *	1.60E+00	5.30E-07	5.30E-07	7.73E-07	7.73E-07 *	8.00E-04	9.66E-04	9.66E-04
LINDANE (GAMMA-BHC)	1.75E-07	1.75E-07 *	1.30E+00	2.27E-07	2.27E-07	4.08E-07	4.08E-07 *	3.00E-04	1.36E-03	1.36E-03
MIREX	3.41E-07	3.41E-07 *	1.80E+00	6.13E-07	6.13E-07	7.95E-07	7.95E-07 *	2.00E-04	3.97E-03	3.97E-03
TRANS-NONACHLOR	3.06E-07	3.06E-07 *	ND	-	-	7.13E-07	7.13E-07 *	ND	-	-
o,p'-DDD	3.41E-07	3.41E-07 *	ND	-	-	7.95E-07	7.95E-07 *	ND	-	-
o,p'-DDE	3.41E-07	3.41E-07 *	ND	-	-	7.95E-07	7.95E-07 *	ND	-	-
o,p'-DDT	3.41E-07	3.41E-07 *	ND	-	-	7.95E-07	7.95E-07 *	ND	-	-
p,p'-DDD	9.19E-07	9.19E-07 *	2.40E-01	2.21E-07	2.21E-07	2.14E-06	2.14E-06 *	ND	-	-
p,p'-DDE	1.89E-06	1.89E-06 *	3.40E-01	6.42E-07	6.42E-07	4.41E-06	4.41E-06 *	ND	-	-
p,p'-DDT	4.43E-07	4.43E-07 *	3.40E-01	1.51E-07	1.51E-07	1.03E-06	1.03E-06 *	5.00E-04	2.07E-03	2.07E-03
POLYCHLORINATED BIPHENYLS (PCBs)										
TOTAL PCBs (AROCHLOR)	3.01E-05	3.01E-05 *	7.70E+00	2.32E-04	2.32E-04	7.02E-05	7.02E-05 *	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				2.45E-04 *	2.45E-04	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			1.48E-01 *	1.48E-01

NOTES:

ND : NO DATA AVAILABLE

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-11
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	2.14E-03	5.65E-03		ND	-	-	5.00E-03	1.32E-02	2.90E+00		1.72E-03	4.54E-03
ARSENIC	9.71E-04	1.92E-03	1.75E+00		1.70E-03	3.37E-03	2.27E-03	4.49E-03	3.00E-04		7.55E+00	1.50E+01
CADMIUM	1.43E-04	3.02E-04		ND	-	-	3.33E-04	7.04E-04	1.00E-03		3.33E-01	7.04E-01
CHROMIUM	5.68E-05	8.37E-05		ND	-	-	1.33E-04	1.95E-04	5.00E-03		2.65E-02	3.90E-02
COPPER	3.87E-03	6.43E-03		ND	-	-	9.03E-03	1.50E-02	3.70E-02		2.44E-01	4.05E-01
IRON	5.67E-03	1.73E-02		ND	-	-	1.32E-02	4.03E-02		ND	-	-
LEAD	1.41E-05	3.89E-05		ND	-	-	3.30E-05	9.08E-05		ND	-	-
MANGANESE	2.84E-04	4.12E-04		ND	-	-	6.62E-04	9.61E-04	1.00E-01		6.62E-03	9.61E-03
MERCURY	8.02E-05	1.04E-04		ND	-	-	1.87E-04	2.42E-04	3.00E-04		6.24E-01	8.08E-01
NICKEL	4.86E-05	1.06E-04		ND	-	-	1.13E-04	2.48E-04	2.00E-02		5.67E-03	1.24E-02
SILVER	5.94E-05	1.04E-04		ND	-	-	1.39E-04	2.43E-04	5.00E-03		2.77E-02	4.86E-02
ZINC	5.78E-03	7.68E-03		ND	-	-	1.35E-02	1.79E-02	2.00E-01		6.75E-02	8.95E-02
PESTICIDES												
ALDRIN	8.07E-08	2.33E-07	1.70E+01		1.37E-06	3.97E-06	1.88E-07	5.45E-07	3.00E-05		6.27E-03	1.82E-02
ALPHA-CHLORDANE	1.70E-07	3.98E-07	1.30E+00		2.21E-07	5.18E-07	3.96E-07	9.29E-07	6.00E-05		6.61E-03	1.55E-02
HEPTACHLOR	5.31E-08	7.65E-08	4.50E+00		2.39E-07	3.44E-07	1.24E-07	1.79E-07	5.00E-04		2.48E-04	3.57E-04
HEPTACHLOR EPOXIDE	7.24E-08	2.05E-07	9.10E+00		6.59E-07	1.86E-06	1.69E-07	4.77E-07	1.30E-05		1.30E-02	3.67E-02
HEXACHLOROBENZENE	5.46E-07	1.37E-06	1.60E+00		8.74E-07	2.20E-06	1.27E-06	3.21E-06	8.00E-04		1.59E-03	4.01E-03
LINDANE (GAMMA-BHC)	1.47E-07	6.94E-07	1.30E+00		1.91E-07	9.02E-07	3.42E-07	1.62E-06	3.00E-04		1.14E-03	5.40E-03
MIREX	5.82E-08	7.82E-08	1.80E+00		1.05E-07	1.41E-07	1.36E-07	1.83E-07	2.00E-04		6.79E-04	9.13E-04
TRANS-NONACHLOR	6.89E-07	1.25E-06		ND	-	-	1.61E-06	2.92E-06		ND	-	-
o,p'-DDD	6.58E-08	1.17E-07		ND	-	-	1.54E-07	2.73E-07		ND	-	-
o,p'-DDE	1.30E-07	2.59E-07		ND	-	-	3.04E-07	6.05E-07		ND	-	-
o,p'-DDT	1.08E-07	2.38E-07		ND	-	-	2.53E-07	5.55E-07		ND	-	-
p,p'-DDD	7.03E-07	1.21E-06	2.40E-01		1.69E-07	2.90E-07	1.64E-06	2.82E-06		ND	-	-
p,p'-DDE	6.82E-06	1.25E-05	3.40E-01		2.32E-06	4.24E-06	1.59E-05	2.91E-05		ND	-	-
p,p'-DDT	3.15E-07	8.50E-07	3.40E-01		1.07E-07	2.89E-07	7.36E-07	1.98E-06	5.00E-04		1.47E-03	3.97E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-11
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	5.01E-06	2.48E-05		ND	-	-	1.17E-05	5.80E-05	3.00E-01		3.90E-05	1.93E-04
BENZO(A)ANTHRACENE	1.27E-05	5.04E-05	5.80E+00		7.36E-05	2.92E-04	2.96E-05	1.18E-04		ND	-	-
BENZO(A)PYRENE	1.41E-05	5.23E-05	5.80E+00		8.20E-05	3.03E-04	3.30E-05	1.22E-04		ND	-	-
BENZO(E)PYRENE	1.75E-05	5.90E-05		ND	-	-	4.08E-05	1.38E-04		ND	-	-
BENZO(G,H,I)PERYLENE	4.87E-06	1.42E-05		ND	-	-	1.14E-05	3.30E-05	4.00E-03		2.84E-03	8.26E-03
CHRYSENE	2.13E-05	8.70E-05	5.80E+00		1.23E-04	5.05E-04	4.97E-05	2.03E-04		ND	-	-
FLUORANTHENE	6.53E-05	2.64E-04		ND	-	-	1.52E-04	6.17E-04	4.00E-02		3.81E-03	1.54E-02
FLUORENE	4.50E-06	2.02E-05		ND	-	-	1.05E-05	4.72E-05	4.00E-02		2.62E-04	1.18E-03
INDENO(1,2,3-CD)PYRENE	4.61E-06	1.39E-05	5.80E+00		2.67E-05	8.06E-05	1.08E-05	3.24E-05		ND	-	-
PERYLENE	7.69E-06	1.83E-05		ND	-	-	1.79E-05	4.27E-05		ND	-	-
PHENANTHRENE	4.14E-05	1.01E-04		ND	-	-	9.65E-05	2.35E-04	4.00E-03		2.41E-02	5.88E-02
PYRENE	5.46E-05	2.16E-04		ND	-	-	1.28E-04	5.03E-04	3.00E-02		4.25E-03	1.68E-02
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	3.89E-05	8.19E-05	7.70E+00		2.99E-04	6.31E-04	9.07E-05	1.91E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					2.31E-03	5.19E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				8.96E+00	1.73E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-12
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS)
CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
PESTICIDES												
ALDRIN	3.99E-08	3.99E-08	1.70E+01		6.79E-07	6.79E-07	9.32E-08	9.32E-08	3.00E-05		3.11E-03	3.11E-03
ALPHA-CHLORDANE	7.36E-08	8.96E-08	1.30E+00		9.57E-08	1.16E-07	1.72E-07	2.09E-07	6.00E-05		2.86E-03	3.48E-03
HEPTACHLOR	4.22E-08	5.79E-08	4.50E+00		1.90E-07	2.60E-07	9.84E-08	1.35E-07	5.00E-04		1.97E-04	2.70E-04
HEPTACHLOR EPOXIDE	6.87E-08	8.47E-08	9.10E+00		6.26E-07	7.71E-07	1.60E-07	1.98E-07	1.30E-05		1.23E-02	1.52E-02
HEXACHLOROBENZENE	4.10E-08	5.52E-07	1.60E+00		6.56E-08	8.83E-07	9.57E-08	1.29E-06	8.00E-04		1.20E-04	1.61E-03
LINDANE (GAMMA-BHC)	2.17E-08	4.21E-08	1.30E+00		2.82E-08	5.48E-08	5.05E-08	9.83E-08	3.00E-04		1.68E-04	3.28E-04
MIREX	4.22E-08	5.81E-08	1.80E+00		7.59E-08	1.05E-07	9.84E-08	1.36E-07	2.00E-04		4.92E-04	6.78E-04
TRANS-NONACHLOR	3.78E-08	7.12E-07		ND	-	-	8.83E-08	1.66E-06		ND	-	-
o,p'-DDE	4.22E-08	1.79E-07		ND	-	-	9.84E-08	4.19E-07		ND	-	-
p,p'-DDD	1.14E-07	2.13E-07	2.40E-01		2.73E-08	5.12E-08	2.66E-07	4.98E-07		ND	-	-
p,p'-DDE	2.34E-07	7.92E-06	3.40E-01		7.95E-08	2.69E-06	5.46E-07	1.85E-05		ND	-	-
p,p'-DDT	5.49E-08	7.08E-08	3.40E-01		1.87E-08	2.41E-08	1.28E-07	1.65E-07	5.00E-04		2.56E-04	3.31E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	3.73E-06	2.91E-05	7.70E+00		2.87E-05	2.24E-04	8.69E-06	6.79E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.06E-05	2.30E-04	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.95E-02	2.50E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-13
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS												
ALUMINUM	5.24E-03	1.38E-02		ND	-	-	1.22E-02	3.22E-02	2.90E+00		4.21E-03	1.11E-02
ARSENIC	2.37E-03	4.70E-03	1.75E+00		4.15E-03	8.23E-03	5.54E-03	1.10E-02	3.00E-04		1.85E+01	3.66E+01
CADMIUM	3.49E-04	7.37E-04		ND	-	-	8.15E-04	1.72E-03	1.00E-03		8.15E-01	1.72E+00
CHROMIUM	1.39E-04	2.05E-04		ND	-	-	3.24E-04	4.77E-04	5.00E-03		6.48E-02	9.54E-02
COPPER	9.45E-03	1.57E-02		ND	-	-	2.21E-02	3.67E-02	3.70E-02		5.96E-01	9.91E-01
IRON	1.38E-02	4.22E-02		ND	-	-	3.23E-02	9.86E-02		ND	-	-
LEAD	3.46E-05	9.51E-05		ND	-	-	8.06E-05	2.22E-04		ND	-	-
MANGANESE	6.93E-04	1.01E-03		ND	-	-	1.62E-03	2.35E-03	1.00E-01		1.62E-02	2.35E-02
MERCURY	1.96E-04	2.54E-04		ND	-	-	4.58E-04	5.93E-04	3.00E-04		1.53E+00	1.98E+00
NICKEL	1.19E-04	2.60E-04		ND	-	-	2.77E-04	6.06E-04	2.00E-02		1.39E-02	3.03E-02
SILVER	1.45E-04	2.55E-04		ND	-	-	3.39E-04	5.94E-04	5.00E-03		6.78E-02	1.19E-01
ZINC	1.41E-02	1.88E-02		ND	-	-	3.30E-02	4.38E-02	2.00E-01		1.65E-01	2.19E-01
PESTICIDES												
ALDRIN	1.97E-07	5.71E-07	1.70E+01		3.35E-06	9.70E-06	4.60E-07	1.33E-06	3.00E-05		1.53E-02	4.44E-02
ALPHA-CHLORDANE	4.15E-07	9.73E-07	1.30E+00		5.40E-07	1.27E-06	9.69E-07	2.27E-06	6.00E-05		1.61E-02	3.79E-02
HEPTACHLOR	1.30E-07	1.87E-07	4.50E+00		5.85E-07	8.42E-07	3.03E-07	4.36E-07	5.00E-04		6.06E-04	8.73E-04
HEPTACHLOR EPOXIDE	1.77E-07	5.00E-07	9.10E+00		1.61E-06	4.55E-06	4.13E-07	1.17E-06	1.30E-05		3.18E-02	8.97E-02
HEXACHLOROBENZENE	1.34E-06	3.36E-06	1.60E+01		2.14E-05	5.38E-05	3.12E-06	7.84E-06	8.00E-04		3.90E-03	9.80E-03
LINDANE (GAMMA-BHC)	3.58E-07	1.70E-06	1.30E+00		4.66E-07	2.21E-06	8.36E-07	3.96E-06	3.00E-04		2.79E-03	1.32E-02
MIREX	1.42E-07	1.91E-07	1.80E+00		2.56E-07	3.44E-07	3.32E-07	4.46E-07	2.00E-04		1.66E-03	2.23E-03
TRANS-NONACHLOR	1.68E-06	3.06E-06		ND	-	-	3.93E-06	7.14E-06		ND	-	-
o,p'-DDD	1.61E-07	2.86E-07		ND	-	-	3.75E-07	6.68E-07		ND	-	-
o,p'-DDE	3.18E-07	6.34E-07		ND	-	-	7.42E-07	1.48E-06		ND	-	-
o,p'-DDT	2.65E-07	5.82E-07		ND	-	-	6.18E-07	1.36E-06		ND	-	-
p,p'-DDD	1.72E-06	2.96E-06	2.40E-01		4.13E-07	7.09E-07	4.01E-06	6.90E-06		ND	-	-
p,p'-DDE	1.67E-05	3.05E-05	3.40E-01		5.67E-06	1.04E-05	3.89E-05	7.12E-05		ND	-	-
p,p'-DDT	7.71E-07	2.08E-06	3.40E-01		2.62E-07	7.06E-07	1.80E-06	4.85E-06	5.00E-04		3.60E-03	9.70E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-13
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	1.23E-05	6.07E-05		ND	-	-	2.86E-05	1.42E-04	3.00E-01		9.53E-05	4.72E-04
BENZO(A)ANTHRACENE	3.10E-05	1.23E-04	5.80E+00		1.80E-04	7.15E-04	7.24E-05	2.88E-04		ND	-	-
BENZO(A)PYRENE	3.46E-05	1.28E-04	5.80E+00		2.00E-04	7.41E-04	8.06E-05	2.98E-04		ND	-	-
BENZO(E)PYRENE	4.27E-05	1.44E-04		ND	-	-	9.97E-05	3.36E-04		ND	-	-
BENZO(G,H,I)PERYLENE	1.19E-05	3.46E-05		ND	-	-	2.78E-05	8.08E-05	4.00E-03		6.95E-03	2.02E-02
CHRYSENE	5.20E-05	2.13E-04	5.80E+00		3.02E-04	1.23E-03	1.21E-04	4.96E-04		ND	-	-
FLUORANTHENE	1.60E-04	6.46E-04		ND	-	-	3.72E-04	1.51E-03	4.00E-02		9.31E-03	3.77E-02
FLUORENE	1.10E-05	4.94E-05		ND	-	-	2.57E-05	1.15E-04	4.00E-02		6.41E-04	2.88E-03
INDENO(1,2,3-CD)PYRENE	1.13E-05	3.40E-05	5.80E+00		6.54E-05	1.97E-04	2.63E-05	7.93E-05		ND	-	-
PERYLENE	1.88E-05	4.47E-05		ND	-	-	4.39E-05	1.04E-04		ND	-	-
PHENANTHRENE	1.01E-04	2.46E-04		ND	-	-	2.36E-04	5.74E-04	4.00E-03		5.90E-02	1.44E-01
PYRENE	1.34E-04	5.27E-04		ND	-	-	3.12E-04	1.23E-03	3.00E-02		1.04E-02	4.10E-02
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	9.50E-05	2.00E-04	7.70E+00		7.31E-04	1.54E-03	2.22E-04	4.67E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.67E-03	1.27E-02	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.19E+01	4.22E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-14
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE)
CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
PESTICIDES												
ALDRIN	2.94E-07	2.94E-07 *	1.70E+01		5.00E-06	5.00E-06	6.86E-07	6.86E-07 *	3.00E-05		2.29E-02	2.29E-02
ALPHA-CHLORDANE	5.42E-07	6.59E-07	1.30E+00		7.04E-07	8.57E-07	1.26E-06	1.54E-06	6.00E-05		2.11E-02	2.56E-02
HEPTACHLOR	3.10E-07	4.26E-07	4.50E+00		1.40E-06	1.92E-06	7.24E-07	9.93E-07	5.00E-04		1.45E-03	1.99E-03
HEPTACHLOR EPOXIDE	5.06E-07	6.23E-07	9.10E+00		4.60E-06	5.67E-06	1.18E-06	1.45E-06	1.30E-05		9.08E-02	1.12E-01
HEXACHLOROBENZENE	3.02E-07	4.06E-06	1.60E+00		4.83E-07	6.50E-06	7.04E-07	9.47E-06	8.00E-04		8.80E-04	1.18E-02
LINDANE (GAMMA-BHC)	1.59E-07	3.10E-07	1.30E+00		2.07E-07	4.03E-07	3.72E-07	7.23E-07	3.00E-04		1.24E-03	2.41E-03
MIREX	3.10E-07	4.28E-07	1.80E+00		5.58E-07	7.70E-07	7.24E-07	9.98E-07	2.00E-04		3.62E-03	4.99E-03
TRANS-NONACHLOR	2.78E-07	5.24E-06		ND	-	-	6.50E-07	1.22E-05		ND	-	-
o,p'-DDE	3.10E-07	1.32E-06		ND	-	-	7.24E-07	3.08E-06		ND	-	-
p,p'-DDD	8.37E-07	1.57E-06	2.40E-01		2.01E-07	3.77E-07	1.95E-06	3.66E-06		ND	-	-
p,p'-DDE	1.72E-06	5.83E-05	3.40E-01		5.85E-07	1.98E-05	4.02E-06	1.36E-04		ND	-	-
p,p'-DDT	4.04E-07	5.21E-07	3.40E-01		1.37E-07	1.77E-07	9.42E-07	1.22E-06	5.00E-04		1.88E-03	2.43E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	2.74E-05	2.14E-04	7.70E+00		2.11E-04	1.65E-03	6.40E-05	5.00E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					2.25E-04	1.69E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.44E-01	1.84E-01

NOTES:

ND : NO DATA AVAILABLE
* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-15
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	9.50E-03	1.87E-02		ND	-	-	2.22E-02	4.36E-02	2.90E+00		7.64E-03	1.50E-02
ARSENIC	2.74E-04	6.97E-04	1.75E+00		4.80E-04	1.22E-03	6.40E-04	1.63E-03	3.00E-04		2.13E+00	5.42E+00
CADMIUM	6.54E-05	1.09E-04		ND	-	-	1.53E-04	2.54E-04	1.00E-03		1.53E-01	2.54E-01
CHROMIUM	1.27E-04	1.91E-04		ND	-	-	2.97E-04	4.47E-04	5.00E-03		5.95E-02	8.94E-02
COPPER	2.64E-04	1.00E-03		ND	-	-	6.16E-04	2.34E-03	3.70E-02		1.67E-02	6.33E-02
IRON	2.07E-02	4.08E-02		ND	-	-	4.82E-02	9.52E-02		ND	-	-
LEAD	3.27E-04	9.89E-04		ND	-	-	7.63E-04	2.31E-03		ND	-	-
MANGANESE	5.50E-04	2.58E-03		ND	-	-	1.28E-03	6.02E-03	1.00E-01		1.28E-02	6.02E-02
MERCURY	1.47E-05	3.47E-05		ND	-	-	3.44E-05	8.11E-05	3.00E-04		1.15E-01	2.70E-01
NICKEL	6.65E-05	1.48E-04		ND	-	-	1.55E-04	3.46E-04	2.00E-02		7.76E-03	1.73E-02
SILVER	1.36E-05	1.29E-04		ND	-	-	3.18E-05	3.02E-04	5.00E-03		6.37E-03	6.03E-02
ZINC	3.97E-03	7.95E-03		ND	-	-	9.26E-03	1.86E-02	2.00E-01		4.63E-02	9.28E-02
PESTICIDES												
ALDRIN	8.72E-08	1.20E-06	1.70E+01		1.48E-06	2.03E-05	2.03E-07	2.79E-06	3.00E-05		6.78E-03	9.30E-02
ALPHA-CHLORDANE	1.25E-07	8.30E-07	1.30E+00		1.63E-07	1.08E-06	2.92E-07	1.94E-06	6.00E-05		4.87E-03	3.23E-02
HEPTACHLOR	2.06E-08	6.66E-09	4.50E+00		9.27E-08	3.00E-08	4.81E-08	1.55E-08	5.00E-04		9.62E-05	3.11E-05
HEPTACHLOR EPOXIDE	1.14E-08	8.02E-08	9.10E+00		1.04E-07	7.30E-07	2.66E-08	1.87E-07	1.30E-05		2.05E-03	1.44E-02
HEXACHLOROBENZENE	7.10E-08	1.74E-06	1.60E+00		1.14E-07	2.78E-06	1.66E-07	4.06E-06	8.00E-04		2.07E-04	5.07E-03
LINDANE (GAMMA-BHC)	5.45E-08	1.31E-06	1.30E+00		7.09E-08	1.71E-06	1.27E-07	3.06E-06	3.00E-04		4.24E-04	1.02E-02
MIREX	2.63E-08	4.72E-08	1.80E+00		4.74E-08	8.50E-08	6.14E-08	1.10E-07	2.00E-04		3.07E-04	5.51E-04
TRANS-NONACHLOR	1.21E-07	8.40E-07		ND	-	-	2.83E-07	1.96E-06		ND	-	-
o,p'-DDD	7.80E-08	6.21E-07		ND	-	-	1.82E-07	1.45E-06		ND	-	-
o,p'-DDE	2.92E-08	5.45E-08		ND	-	-	6.81E-08	1.27E-07		ND	-	-
o,p'-DDT	9.95E-08	1.10E-06		ND	-	-	2.32E-07	2.57E-06		ND	-	-
p,p'-DDD	4.76E-07	3.03E-06	2.40E-01		1.14E-07	7.26E-07	1.11E-06	7.06E-06		ND	-	-
p,p'-DDE	4.66E-07	3.29E-06	3.40E-01		1.58E-07	1.12E-06	1.09E-06	7.68E-06		ND	-	-
p,p'-DDT	4.38E-07	3.05E-06	3.40E-01		1.49E-07	1.04E-06	1.02E-06	7.12E-06	5.00E-04		2.04E-03	1.42E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-15
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	3.63E-07	2.06E-06		ND	-	-	8.48E-07	4.80E-06	3.00E-01		2.83E-06	1.60E-05
BENZO(A)ANTHRACENE	6.55E-07	2.35E-06	5.80E+00		3.80E-06	1.36E-05	1.53E-06	5.48E-06		ND	-	-
BENZO(A)PYRENE	4.25E-07	1.45E-06	5.80E+00		2.47E-06	8.38E-06	9.92E-07	3.37E-06		ND	-	-
BENZO(E)PYRENE	1.49E-06	4.18E-06		ND	-	-	3.48E-06	9.76E-06		ND	-	-
CHRYSENE	1.33E-06	3.01E-06	5.80E+00		7.73E-06	1.74E-05	3.11E-06	7.01E-06		ND	-	-
FLUORANTHENE	3.16E-06	8.56E-06		ND	-	-	7.37E-06	2.00E-05	4.00E-02		1.84E-04	4.99E-04
PERYLENE	6.12E-07	1.33E-06		ND	-	-	1.43E-06	3.11E-06		ND	-	-
PHENANTHRENE	1.12E-06	4.18E-06		ND	-	-	2.61E-06	9.76E-06	4.00E-03		6.53E-04	2.44E-03
PYRENE	3.01E-06	7.61E-06		ND	-	-	7.02E-06	1.78E-05	3.00E-02		2.34E-04	5.92E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	6.83E-06	1.90E-05	7.70E+00		5.26E-05	1.47E-04	1.59E-05	4.44E-05				
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.49E-04	1.44E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.58E+00	6.52E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-16
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
INORGANICS										
ALUMINUM	1.09E-02	1.70E-02	ND	-	-	2.54E-02	3.97E-02	2.90E+00	8.75E-03	1.37E-02
ARSENIC	3.01E-04	4.06E-04	1.75E+00	5.26E-04	7.10E-04	7.01E-04	9.47E-04	3.00E-04	2.34E+00	3.16E+00
CADMIUM	5.28E-05	6.42E-05	ND	-	-	1.23E-04	1.50E-04	1.00E-03	1.23E-01	1.50E-01
CHROMIUM	1.35E-04	1.59E-04	ND	-	-	3.14E-04	3.72E-04	5.00E-03	6.28E-02	7.44E-02
COPPER	2.15E-04	2.48E-04	ND	-	-	5.03E-04	5.79E-04	3.70E-02	1.36E-02	1.57E-02
IRON	2.17E-02	3.24E-02	ND	-	-	5.05E-02	7.56E-02	ND	-	-
LEAD	2.61E-04	4.28E-04	ND	-	-	6.09E-04	9.99E-04	ND	-	-
MANGANESE	4.03E-04	5.18E-04	ND	-	-	9.41E-04	1.21E-03	1.00E-01	9.41E-03	1.21E-02
MERCURY	1.94E-05	2.74E-05	ND	-	-	4.52E-05	6.39E-05	3.00E-04	1.51E-01	2.13E-01
NICKEL	6.17E-05	9.27E-05	ND	-	-	1.44E-04	2.16E-04	2.00E-02	7.20E-03	1.08E-02
SILVER	5.14E-06	6.78E-06	ND	-	-	1.20E-05	1.58E-05	5.00E-03	2.40E-03	3.17E-03
ZINC	3.88E-03	5.99E-03	ND	-	-	9.06E-03	1.40E-02	2.00E-01	4.53E-02	6.99E-02
PESTICIDES										
ALDRIN	2.70E-07	1.20E-06	1.70E+01	4.59E-06	2.03E-05	6.30E-07	2.79E-06	3.00E-05	2.10E-02	9.30E-02
ALPHA-CHLORDANE	2.47E-07	8.30E-07	1.30E+00	3.21E-07	1.08E-06	5.76E-07	1.94E-06	6.00E-05	9.59E-03	3.23E-02
HEXACHLOROBENZENE	3.59E-07	1.74E-06	1.60E+00	5.74E-07	2.78E-06	8.37E-07	4.06E-06	8.00E-04	1.05E-03	5.07E-03
TRANS-NONACHLOR	2.49E-07	8.40E-07	ND	-	-	5.80E-07	1.96E-06	ND	-	-
o,p'-DDD	1.42E-07	6.21E-07	ND	-	-	3.32E-07	1.45E-06	ND	-	-
p,p'-DDD	8.04E-07	3.03E-06	2.40E-01	1.93E-07	7.26E-07	1.88E-06	7.06E-06	ND	-	-
p,p'-DDE	8.76E-07	3.29E-06	3.40E-01	2.98E-07	1.12E-06	2.04E-06	7.68E-06	ND	-	-
p,p'-DDT	7.24E-07	3.05E-06	3.40E-01	2.46E-07	1.04E-06	1.69E-06	7.12E-06	5.00E-04	3.38E-03	1.42E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-16
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
BENZ(A)ANTHRACENE	1.07E-06	2.35E-06	5.80E+00		6.21E-06	1.36E-05	2.50E-06	5.48E-06		ND	-	-
BENZO(A)PYRENE	7.52E-07	1.45E-06	5.80E+00		4.36E-06	8.38E-06	1.76E-06	3.37E-06		ND	-	-
BENZO(E)PYRENE	1.56E-06	2.43E-06		ND	-	-	3.63E-06	5.67E-06		ND	-	-
CHRYSENE	1.51E-06	3.01E-06	5.80E+00		8.77E-06	1.74E-05	3.53E-06	7.01E-06		ND	-	-
FLUORANTHENE	3.44E-06	7.01E-06		ND	-	-	8.02E-06	1.63E-05	4.00E-02		2.00E-04	4.09E-04
PERYLENE	6.00E-07	1.28E-06		ND	-	-	1.40E-06	2.98E-06		ND	-	-
PHENANTHRENE	1.54E-06	4.18E-06		ND	-	-	3.60E-06	9.76E-06	4.00E-03		8.99E-04	2.44E-03
PYRENE	3.40E-06	6.59E-06		ND	-	-	7.92E-06	1.54E-05	3.00E-02		2.64E-04	5.13E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	5.48E-06	7.39E-06	7.70E+00		4.22E-05	5.69E-05	1.28E-05	1.72E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.94E-04	8.34E-04	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.80E+00	3.87E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-17
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	8.94E-03	1.87E-02		ND	-	-	2.09E-02	4.36E-02	2.90E+00		7.19E-03	1.50E-02
ARSENIC	2.29E-04	4.28E-04	1.75E+00		4.01E-04	7.49E-04	5.34E-04	9.99E-04	3.00E-04		1.78E+00	3.33E+00
CADMIUM	6.79E-05	1.09E-04		ND	-	-	1.58E-04	2.54E-04	1.00E-03		1.58E-01	2.54E-01
CHROMIUM	1.17E-04	1.55E-04		ND	-	-	2.73E-04	3.61E-04	5.00E-03		5.46E-02	7.23E-02
COPPER	2.75E-04	1.00E-03		ND	-	-	6.42E-04	2.34E-03	3.70E-02		1.74E-02	6.33E-02
IRON	2.01E-02	4.08E-02		ND	-	-	4.69E-02	9.52E-02		ND	-	-
LEAD	3.23E-04	9.89E-04		ND	-	-	7.55E-04	2.31E-03		ND	-	-
MANGANESE	5.48E-04	2.58E-03		ND	-	-	1.28E-03	6.02E-03	1.00E-01		1.28E-02	6.02E-02
MERCURY	1.47E-05	3.47E-05		ND	-	-	3.43E-05	8.11E-05	3.00E-04		1.14E-01	2.70E-01
NICKEL	6.12E-05	1.11E-04		ND	-	-	1.43E-04	2.60E-04	2.00E-02		7.14E-03	1.30E-02
SILVER	7.67E-06	9.21E-05		ND	-	-	1.79E-05	2.15E-04	5.00E-03		3.58E-03	4.30E-02
ZINC	3.80E-03	7.95E-03		ND	-	-	8.87E-03	1.86E-02	2.00E-01		4.43E-02	9.28E-02
PESTICIDES												
ALDRIN	5.45E-08	1.43E-07	1.70E+01		9.27E-07	2.43E-06	1.27E-07	3.33E-07	3.00E-05		4.24E-03	1.11E-02
ALPHA-CHLORDANE	8.08E-08	2.58E-07	1.30E+00		1.05E-07	3.35E-07	1.89E-07	6.02E-07	6.00E-05		3.14E-03	1.00E-02
HEPTACHLOR EPOXIDE	1.05E-08	8.02E-08	9.10E+00		9.52E-08	7.30E-07	2.44E-08	1.87E-07	1.30E-05		1.88E-03	1.44E-02
LINDANE (GAMMA-BHC)	7.55E-08	1.31E-06	1.30E+00		9.81E-08	1.71E-06	1.76E-07	3.06E-06	3.00E-04		5.87E-04	1.02E-02
TRANS-NONACHLOR	7.96E-08	1.74E-07		ND	-	-	1.86E-07	4.07E-07		ND	-	-
o,p'-DDD	4.22E-08	2.58E-07		ND	-	-	9.84E-08	6.03E-07		ND	-	-
o,p'-DDE	2.69E-08	5.45E-08		ND	-	-	6.29E-08	1.27E-07		ND	-	-
o,p'-DDT	1.24E-07	1.10E-06		ND	-	-	2.89E-07	2.57E-06		ND	-	-
p,p'-DDD	2.73E-07	7.21E-07	2.40E-01		6.55E-08	1.73E-07	6.37E-07	1.68E-06		ND	-	-
p,p'-DDE	3.38E-07	6.45E-07	3.40E-01		1.15E-07	2.19E-07	7.89E-07	1.50E-06		ND	-	-
p,p'-DDT	4.23E-07	2.25E-06	3.40E-01		1.44E-07	7.64E-07	9.87E-07	5.25E-06	5.00E-04		1.97E-03	1.05E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-17
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
ANALYTE	CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	5.49E-07	2.06E-06		ND	-	-	1.28E-06	4.80E-06	3.00E-01		4.27E-06	1.60E-05
BENZO(E)PYRENE	1.13E-06	2.43E-06		ND	-	-	2.63E-06	5.66E-06		ND	-	-
CHRYSENE	1.18E-06	2.30E-06	5.80E+00		6.86E-06	1.33E-05	2.76E-06	5.37E-06		ND	-	-
FLUORANTHENE	2.81E-06	4.42E-06		ND	-	-	6.55E-06	1.03E-05	4.00E-02		1.64E-04	2.58E-04
PERYLENE	6.01E-07	1.33E-06		ND	-	-	1.40E-06	3.11E-06		ND	-	-
PHENANTHRENE	1.11E-06	1.79E-06		ND	-	-	2.58E-06	4.17E-06	4.00E-03		6.46E-04	1.04E-03
PYRENE	2.55E-06	4.21E-06		ND	-	-	5.96E-06	9.82E-06	3.00E-02		1.99E-04	3.27E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	6.22E-06	1.54E-05	7.70E+00		4.79E-05	1.18E-04	1.45E-05	3.59E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					4.57E-04	8.87E-04	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.21E+00	4.27E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-18
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS												
ALUMINUM	9.67E-03	1.49E-02		ND	-	-	2.26E-02	3.48E-02	2.90E+00		7.78E-03	1.20E-02
ARSENIC	3.59E-04	6.97E-04	1.75E+00		6.29E-04	1.22E-03	8.39E-04	1.63E-03	3.00E-04		2.80E+00	5.42E+00
CADMIUM	7.33E-05	9.21E-05		ND	-	-	1.71E-04	2.15E-04	1.00E-03		1.71E-01	2.15E-01
CHROMIUM	1.43E-04	1.91E-04		ND	-	-	3.34E-04	4.47E-04	5.00E-03		6.68E-02	8.94E-02
COPPER	2.77E-04	4.02E-04		ND	-	-	6.47E-04	9.38E-04	3.70E-02		1.75E-02	2.54E-02
IRON	2.09E-02	3.06E-02		ND	-	-	4.87E-02	7.14E-02		ND	-	-
LEAD	3.59E-04	5.89E-04		ND	-	-	8.38E-04	1.37E-03		ND	-	-
MANGANESE	6.11E-04	1.80E-03		ND	-	-	1.43E-03	4.21E-03	1.00E-01		1.43E-02	4.21E-02
MERCURY	1.19E-05	1.84E-05		ND	-	-	2.78E-05	4.30E-05	3.00E-04		9.26E-02	1.43E-01
NICKEL	7.92E-05	1.48E-04		ND	-	-	1.85E-04	3.46E-04	2.00E-02		9.24E-03	1.73E-02
SILVER	3.25E-05	1.29E-04		ND	-	-	7.59E-05	3.02E-04	5.00E-03		1.52E-02	6.03E-02
ZINC	4.40E-03	5.86E-03		ND	-	-	1.03E-02	1.37E-02	2.00E-01		5.13E-02	6.84E-02
PESTICIDES												
ALDRIN	5.64E-08	1.14E-07	1.70E+01		9.59E-07	1.95E-06	1.32E-07	2.67E-07	3.00E-05		4.39E-03	8.90E-03
ALPHA-CHLORDANE	1.70E-07	3.66E-07	1.30E+00		2.21E-07	4.75E-07	3.97E-07	8.53E-07	6.00E-05		6.62E-03	1.42E-02
HEPTACHLOR	1.84E-08	6.34E-09	4.50E+00		8.27E-08	2.85E-08	4.29E-08	1.48E-08	5.00E-04		8.58E-05	2.96E-05
HEPTACHLOR EPOXIDE	9.83E-09	1.90E-09	9.10E+00		8.94E-08	1.73E-08	2.29E-08	4.44E-09	1.30E-05		1.76E-03	3.41E-04
HEXACHLOROBENZENE	3.04E-08	1.05E-08	1.60E+00		4.87E-08	1.67E-08	7.10E-08	2.44E-08	8.00E-04		8.88E-05	3.05E-05
LINDANE (GAMMA-BHC)	1.78E-08	4.88E-08	1.30E+00		2.31E-08	6.35E-08	4.14E-08	1.14E-07	3.00E-04		1.38E-04	3.80E-04
MIREX	2.19E-08	4.69E-08	1.80E+00		3.94E-08	8.45E-08	5.10E-08	1.09E-07	2.00E-04		2.55E-04	5.47E-04
TRANS-NONACHLOR	1.52E-07	3.82E-07		ND	-	-	3.56E-07	8.91E-07		ND	-	-
o,p'-DDD	1.28E-07	4.33E-07		ND	-	-	3.00E-07	1.01E-06		ND	-	-
o,p'-DDE	2.35E-08	2.69E-08		ND	-	-	5.47E-08	6.29E-08		ND	-	-
o,p'-DDT	7.45E-08	1.94E-07		ND	-	-	1.74E-07	4.53E-07		ND	-	-
p,p'-DDD	8.13E-07	2.23E-06	2.40E-01		1.95E-07	5.36E-07	1.90E-06	5.21E-06		ND	-	-
p,p'-DDE	5.49E-07	1.45E-06	3.40E-01		1.87E-07	4.93E-07	1.28E-06	3.38E-06		ND	-	-
p,p'-DDT	3.22E-07	7.27E-07	3.40E-01		1.10E-07	2.47E-07	7.52E-07	1.70E-06	5.00E-04		1.50E-03	3.39E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-18
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	CARCINOGENIC RISKS: ORAL SLOPE FACTOR (mg/kg/day)-1	CARCINOGENIC RISKS: CHEMICAL SPECIFIC RISK AVG	CARCINOGENIC RISKS: CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	NONCARCINOGENIC RISKS: RfD (mg/kg/day)	NONCARCINOGENIC RISKS: CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	NONCARCINOGENIC RISKS: CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
POLYAROMATIC HYDROCARBONS										
BENZ(A)ANTHRACENE	6.97E-07	1.91E-06	5.80E+00	4.04E-06	1.11E-05	1.63E-06	4.45E-06	ND	-	-
BENZO(E)PYRENE	2.03E-06	4.18E-06	ND	-	-	4.75E-06	9.76E-06	ND	-	-
CHRYSENE	1.46E-06	2.85E-06	5.80E+00	8.49E-06	1.65E-05	3.42E-06	6.66E-06	ND	-	-
FLUORANTHENE	3.55E-06	8.56E-06	ND	-	-	8.29E-06	2.00E-05	4.00E-02	2.07E-04	4.99E-04
PERYLENE	6.46E-07	1.24E-06	ND	-	-	1.51E-06	2.90E-06	ND	-	-
PHENANTHRENE	8.73E-07	1.66E-06	ND	-	-	2.04E-06	3.88E-06	4.00E-03	5.09E-04	9.71E-04
PYRENE	3.51E-06	7.61E-06	ND	-	-	8.19E-06	1.78E-05	3.00E-02	2.73E-04	5.92E-04
POLYCHLORINATED BIPHENYLS (PCBs)										
TOTAL PCBs (AROCHLOR)	9.01E-06	1.90E-05	7.70E+00	6.94E-05	1.46E-04	2.10E-05	4.44E-05	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				7.13E-04	1.40E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			3.26E+00	6.13E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-19
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	7.90E-03	1.08E-02		ND	-	-	1.84E-02	2.52E-02	2.90E+00		6.36E-03	8.68E-03
ARSENIC	1.75E-04	3.08E-04	1.75E+00		3.06E-04	5.38E-04	4.08E-04	7.18E-04	3.00E-04		1.36E+00	2.39E+00
CADMIUM	6.07E-05	6.84E-05		ND	-	-	1.42E-04	1.59E-04	1.00E-03		1.42E-01	1.59E-01
CHROMIUM	8.35E-05	1.07E-04		ND	-	-	1.95E-04	2.51E-04	5.00E-03		3.90E-02	5.01E-02
COPPER	2.73E-04	3.03E-04		ND	-	-	6.36E-04	7.06E-04	3.70E-02		1.72E-02	1.91E-02
IRON	1.61E-02	1.97E-02		ND	-	-	3.76E-02	4.59E-02		ND	-	-
LEAD	8.32E-05	1.22E-04		ND	-	-	1.94E-04	2.85E-04		ND	-	-
MANGANESE	3.77E-04	4.60E-04		ND	-	-	8.80E-04	1.07E-03	1.00E-01		8.80E-03	1.07E-02
MERCURY	1.34E-05	2.15E-05		ND	-	-	3.13E-05	5.02E-05	3.00E-04		1.04E-01	1.67E-01
NICKEL	4.91E-05	6.35E-05		ND	-	-	1.15E-04	1.48E-04	2.00E-02		5.73E-03	7.40E-03
SILVER	4.22E-06	5.74E-06		ND	-	-	9.86E-06	1.34E-05	5.00E-03		1.97E-03	2.68E-03
ZINC	3.61E-03	4.11E-03		ND	-	-	8.42E-03	9.59E-03	2.00E-01		4.21E-02	4.79E-02
PESTICIDES												
ALDRIN	2.75E-08	6.28E-08	1.70E+01		4.68E-07	1.07E-06	6.42E-08	1.46E-07	3.00E-05		2.14E-03	4.88E-03
ALPHA-CHLORDANE	1.22E-07	3.20E-07	1.30E+00		1.59E-07	4.17E-07	2.85E-07	7.48E-07	6.00E-05		4.75E-03	1.25E-02
HEPTACHLOR	7.29E-08	2.43E-07	4.50E+00		3.28E-07	1.09E-06	1.70E-07	5.66E-07	5.00E-04		3.40E-04	1.13E-03
TRANS-NONACHLOR	1.82E-07	3.70E-07		ND	-	-	4.24E-07	8.63E-07		ND	-	-
o,p'-DDD	9.70E-08	1.68E-07		ND	-	-	2.26E-07	3.92E-07		ND	-	-
o,p'-DDT	3.25E-08	7.45E-08		ND	-	-	7.58E-08	1.74E-07		ND	-	-
p,p'-DDD	2.48E-07	3.16E-07	2.40E-01		5.96E-08	7.59E-08	5.79E-07	7.38E-07		ND	-	-
p,p'-DDE	2.31E-07	2.84E-07	3.40E-01		7.85E-08	9.64E-08	5.39E-07	6.62E-07		ND	-	-
p,p'-DDT	3.50E-07	9.37E-07	3.40E-01		1.19E-07	3.19E-07	8.17E-07	2.19E-06	5.00E-04		1.63E-03	4.37E-03
POLYAROMATIC HYDROCARBONS												
FLUORANTHENE	1.59E-06	2.24E-06		ND	-	-	3.70E-06	5.22E-06	4.00E-02		9.26E-05	1.30E-04
PHENANTHRENE	1.09E-06	2.04E-06		ND	-	-	2.55E-06	4.77E-06	4.00E-03		6.38E-04	1.19E-03
PYRENE	1.02E-06	1.81E-06		ND	-	-	2.37E-06	4.22E-06	3.00E-02		7.90E-05	1.41E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.33E-06	5.27E-06	7.70E+00		3.34E-05	4.06E-05	1.01E-05	1.23E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.40E-04	5.82E-04	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.74E+00	2.89E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-20
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1	CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)	CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS										
ALUMINUM	1.40E-02	2.10E-02	ND	-	-	3.26E-02	4.90E-02	2.90E+00	1.12E-02	1.69E-02
ARSENIC	3.47E-04	5.64E-04	1.75E+00	6.07E-04	9.88E-04	8.09E-04	1.32E-03	3.00E-04	2.70E+00	4.39E+00
CADMIUM	8.75E-05	1.34E-04	ND	-	-	2.04E-04	3.12E-04	1.00E-03	2.04E-01	3.12E-01
CHROMIUM	1.95E-04	2.67E-04	ND	-	-	4.55E-04	6.23E-04	5.00E-03	9.10E-02	1.25E-01
COPPER	3.10E-04	3.56E-04	ND	-	-	7.24E-04	8.30E-04	3.70E-02	1.96E-02	2.24E-02
IRON	2.82E-02	3.87E-02	ND	-	-	6.58E-02	9.02E-02	ND	-	-
LEAD	1.67E-04	2.10E-04	ND	-	-	3.90E-04	4.89E-04	ND	-	-
MANGANESE	1.82E-03	3.57E-03	ND	-	-	4.24E-03	8.34E-03	1.00E-01	4.24E-02	8.34E-02
MERCURY	1.27E-05	1.81E-05	ND	-	-	2.97E-05	4.22E-05	3.00E-04	9.91E-02	1.41E-01
NICKEL	8.57E-05	9.76E-05	ND	-	-	2.00E-04	2.28E-04	2.00E-02	1.00E-02	1.14E-02
SILVER	6.54E-05	8.70E-05	ND	-	-	1.53E-04	2.03E-04	5.00E-03	3.05E-02	4.06E-02
ZINC	4.69E-03	5.94E-03	ND	-	-	1.09E-02	1.39E-02	2.00E-01	5.47E-02	6.93E-02
PESTICIDES										
ALDRIN	8.34E-08	9.35E-08	1.70E+01	1.42E-06	1.59E-06	1.95E-07	2.18E-07	3.00E-05	6.48E-03	7.27E-03
ALPHA-CHLORDANE	2.28E-07	3.07E-07	1.30E+00	2.97E-07	3.99E-07	5.33E-07	7.17E-07	6.00E-05	8.88E-03	1.19E-02
LINDANE (GAMMA-BHC)	4.18E-08	1.62E-07	1.30E+00	5.44E-08	2.11E-07	9.76E-08	3.78E-07	3.00E-04	3.25E-04	1.26E-03
TRANS-NONACHLOR	1.87E-07	2.75E-07	ND	-	-	4.36E-07	6.42E-07	ND	-	-
o,p'-DDD	8.56E-08	1.57E-07	ND	-	-	2.00E-07	3.67E-07	ND	-	-
o,p'-DDT	2.85E-08	7.74E-08	ND	-	-	6.66E-08	1.80E-07	ND	-	-
p,p'-DDD	5.22E-07	7.90E-07	2.40E-01	1.25E-07	1.90E-07	1.22E-06	1.84E-06	ND	-	-
p,p'-DDE	7.62E-07	1.42E-06	3.40E-01	2.59E-07	4.84E-07	1.78E-06	3.32E-06	ND	-	-
p,p'-DDT	2.00E-07	5.10E-07	3.40E-01	6.81E-08	1.73E-07	4.68E-07	1.19E-06	5.00E-04	9.35E-04	2.38E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-20
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
POLYAROMATIC HYDROCARBONS										
BENZO(A)ANTHRACENE	1.88E-06	3.80E-06	5.80E+00	1.09E-05	2.21E-05	4.38E-06	8.88E-06	ND	-	-
BENZO(A)PYRENE	2.20E-06	3.80E-06	5.80E+00	1.27E-05	2.21E-05	5.13E-06	8.88E-06	ND	-	-
BENZO(E)PYRENE	4.77E-06	8.88E-06	ND	-	-	1.11E-05	2.07E-05	ND	-	-
CHRYSENE	2.90E-06	5.07E-06	5.80E+00	1.68E-05	2.94E-05	6.76E-06	1.18E-05	ND	-	-
FLUORANTHENE	3.70E-06	5.71E-06	ND	-	-	8.64E-06	1.33E-05	4.00E-02	2.16E-04	3.33E-04
PERYLENE	2.29E-06	3.49E-06	ND	-	-	5.35E-06	8.14E-06	ND	-	-
PHENANTHRENE	5.02E-07	1.33E-06	ND	-	-	1.17E-06	3.09E-06	4.00E-03	2.93E-04	7.73E-04
PYRENE	5.57E-06	1.11E-05	ND	-	-	1.30E-05	2.59E-05	3.00E-02	4.33E-04	8.63E-04
POLYCHLORINATED BIPHENYLS (PCBs)										
TOTAL PCBs (AROCHLOR)	2.86E-06	1.15E-05	7.70E+00	2.20E-05	8.86E-05	6.66E-06	2.68E-05	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				6.72E-04	1.15E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			3.28E+00	5.23E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-21
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	2.32E-02	4.57E-02		ND	–	–	5.42E-02	1.07E-01	2.90E+00		1.87E-02	3.68E-02
ARSENIC	6.70E-04	1.70E-03	1.75E+00		1.17E-03	2.98E-03	1.56E-03	3.98E-03	3.00E-04		5.21E+00	1.33E+01
CADMIUM	1.60E-04	2.66E-04		ND	–	–	3.73E-04	6.21E-04	1.00E-03		3.73E-01	6.21E-01
CHROMIUM	3.12E-04	4.68E-04		ND	–	–	7.27E-04	1.09E-03	5.00E-03		1.45E-01	2.18E-01
COPPER	6.46E-04	2.45E-03		ND	–	–	1.51E-03	5.72E-03	3.70E-02		4.07E-02	1.55E-01
IRON	5.05E-02	9.97E-02		ND	–	–	1.18E-01	2.33E-01		ND	–	–
LEAD	7.99E-04	2.42E-03		ND	–	–	1.87E-03	5.64E-03		ND	–	–
MANGANESE	1.34E-03	6.31E-03		ND	–	–	3.14E-03	1.47E-02	1.00E-01		3.14E-02	1.47E-01
MERCURY	3.60E-05	8.49E-05		ND	–	–	8.41E-05	1.98E-04	3.00E-04		2.80E-01	6.61E-01
NICKEL	1.63E-04	3.63E-04		ND	–	–	3.79E-04	8.46E-04	2.00E-02		1.90E-02	4.23E-02
SILVER	3.34E-05	3.16E-04		ND	–	–	7.78E-05	7.37E-04	5.00E-03		1.56E-02	1.47E-01
ZINC	9.70E-03	1.94E-02		ND	–	–	2.26E-02	4.54E-02	2.00E-01		1.13E-01	2.27E-01
PESTICIDES												
ALDRIN	2.13E-07	2.92E-06	1.70E+01		3.62E-06	4.97E-05	4.97E-07	6.82E-06	3.00E-05		1.66E-02	2.27E-01
ALPHA-CHLORDANE	3.06E-07	2.03E-06	1.30E+00		3.98E-07	2.64E-06	7.14E-07	4.74E-06	6.00E-05		1.19E-02	7.89E-02
HEPTACHLOR	5.04E-08	1.63E-08	4.50E+00		2.27E-07	7.32E-08	1.18E-07	3.80E-08	5.00E-04		2.35E-04	7.59E-05
HEPTACHLOR EPOXIDE	2.79E-08	1.96E-07	9.10E+00		2.54E-07	1.78E-06	6.51E-08	4.57E-07	1.30E-05		5.01E-03	3.52E-02
HEXACHLOROBENZENE	1.74E-07	4.25E-06	1.60E+00		2.78E-07	6.80E-06	4.05E-07	9.92E-06	8.00E-04		5.06E-04	1.24E-02
LINDANE (GAMMA-BHC)	1.33E-07	3.21E-06	1.30E+00		1.73E-07	4.17E-06	3.11E-07	7.49E-06	3.00E-04		1.04E-03	2.50E-02
MIREX	6.43E-08	1.15E-07	1.80E+00		1.16E-07	2.08E-07	1.50E-07	2.69E-07	2.00E-04		7.50E-04	1.35E-03
TRANS-NONACHLOR	2.97E-07	2.05E-06		ND	–	–	6.93E-07	4.79E-06		ND	–	–
o,p'-DDD	1.91E-07	1.52E-06		ND	–	–	4.45E-07	3.54E-06		ND	–	–
o,p'-DDE	7.13E-08	1.33E-07		ND	–	–	1.66E-07	3.11E-07		ND	–	–
o,p'-DDT	2.43E-07	2.69E-06		ND	–	–	5.68E-07	6.28E-06		ND	–	–
p,p'-DDD	1.16E-06	7.40E-06	2.40E-01		2.80E-07	1.78E-06	2.72E-06	1.73E-05		ND	–	–
p,p'-DDE	1.14E-06	8.05E-06	3.40E-01		3.87E-07	2.74E-06	2.66E-06	1.88E-05		ND	–	–
p,p'-DDT	1.07E-06	7.46E-06	3.40E-01		3.64E-07	2.54E-06	2.50E-06	1.74E-05	5.00E-04		4.99E-03	3.48E-02

NOTES:

ND – NO DATA AVAILABLE

TABLE 5-21
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	8.88E-07	5.03E-06		ND	-	-	2.07E-06	1.17E-05	3.00E-01		6.91E-06	3.91E-05
BENZO(A)ANTHRACENE	1.60E-06	5.74E-06	5.80E+00		9.28E-06	3.33E-05	3.73E-06	1.34E-05		ND	-	-
BENZO(A)PYRENE	1.04E-06	3.53E-06	5.80E+00		6.03E-06	2.05E-05	2.42E-06	8.25E-06		ND	-	-
BENZO(E)PYRENE	3.64E-06	1.02E-05		ND	-	-	8.49E-06	2.39E-05		ND	-	-
CHRYSENE	3.26E-06	7.35E-06	5.80E+00		1.89E-05	4.26E-05	7.60E-06	1.71E-05		ND	-	-
FLUORANTHENE	7.72E-06	2.09E-05		ND	-	-	1.80E-05	4.88E-05	4.00E-02		4.50E-04	1.22E-03
PERYLENE	1.49E-06	3.25E-06		ND	-	-	3.49E-06	7.59E-06		ND	-	-
PHENANTHRENE	2.73E-06	1.02E-05		ND	-	-	6.38E-06	2.39E-05	4.00E-03		1.60E-03	5.97E-03
PYRENE	7.36E-06	1.86E-05		ND	-	-	1.72E-05	4.34E-05	3.00E-02		5.72E-04	1.45E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	1.67E-05	4.65E-05	7.70E+00		1.28E-04	3.58E-04	3.89E-05	1.09E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.34E-03	3.51E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				6.30E+00	1.59E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-22
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	8.00E-02	1.25E-01		ND	-	-	1.87E-01	2.92E-01	2.90E+00		6.44E-02	1.01E-01
ARSENIC	2.21E-03	2.99E-03	1.75E+00		3.87E-03	5.23E-03	5.16E-03	6.97E-03	3.00E-04		1.72E+01	2.32E+01
CADMIUM	3.89E-04	4.72E-04		ND	-	-	9.07E-04	1.10E-03	1.00E-03		9.07E-01	1.10E+00
CHROMIUM	9.91E-04	1.17E-03		ND	-	-	2.31E-03	2.74E-03	5.00E-03		4.62E-01	5.48E-01
COPPER	1.59E-03	1.83E-03		ND	-	-	3.70E-03	4.26E-03	3.70E-02		1.00E-01	1.15E-01
IRON	1.59E-01	2.39E-01		ND	-	-	3.72E-01	5.57E-01		ND	-	-
LEAD	1.92E-03	3.15E-03		ND	-	-	4.48E-03	7.35E-03		ND	-	-
MANGANESE	2.97E-03	3.81E-03		ND	-	-	6.93E-03	8.89E-03	1.00E-01		6.93E-02	8.89E-02
MERCURY	1.42E-04	2.02E-04		ND	-	-	3.32E-04	4.70E-04	3.00E-04		1.11E+00	1.57E+00
NICKEL	4.54E-04	6.82E-04		ND	-	-	1.06E-03	1.59E-03	2.00E-02		5.30E-02	7.96E-02
SILVER	3.78E-05	4.99E-05		ND	-	-	8.83E-05	1.16E-04	5.00E-03		1.77E-02	2.33E-02
ZINC	2.86E-02	4.41E-02		ND	-	-	6.67E-02	1.03E-01	2.00E-01		3.33E-01	5.14E-01
PESTICIDES												
ALDRIN	1.99E-06	8.80E-06	1.70E+01		3.37E-05	1.50E-04	4.63E-06	2.05E-05	3.00E-05		1.54E-01	6.84E-01
ALPHA-CHLORDANE	1.81E-06	6.11E-06	1.30E+00		2.36E-06	7.94E-06	4.23E-06	1.43E-05	6.00E-05		7.06E-02	2.38E-01
HEXACHLOROBENZENE	2.64E-06	1.28E-05	1.60E+00		4.22E-06	2.05E-05	6.16E-06	2.98E-05	8.00E-04		7.69E-03	3.73E-02
TRANS-NONACHLOR	1.83E-06	6.18E-06		ND	-	-	4.27E-06	1.44E-05		ND	-	-
o,p'-DDD	1.05E-06	4.57E-06		ND	-	-	2.44E-06	1.07E-05		ND	-	-
p,p'-DDD	5.91E-06	2.23E-05	2.40E-01		1.42E-06	5.34E-06	1.38E-05	5.19E-05		ND	-	-
p,p'-DDE	6.45E-06	2.42E-05	3.40E-01		2.19E-06	8.24E-06	1.50E-05	5.65E-05		ND	-	-
p,p'-DDT	5.33E-06	2.25E-05	3.40E-01		1.81E-06	7.64E-06	1.24E-05	5.24E-05	5.00E-04		2.49E-02	1.05E-01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-22
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
POLYAROMATIC HYDROCARBONS												
BENZO(A)ANTHRACENE	7.88E-06	1.73E-05	5.80E+00		4.57E-05	1.00E-04	1.84E-05	4.03E-05		ND	-	-
BENZO(A)PYRENE	5.54E-06	1.06E-05	5.80E+00		3.21E-05	6.17E-05	1.29E-05	2.48E-05		ND	-	-
BENZO(E)PYRENE	1.14E-05	1.79E-05		ND	-	-	2.67E-05	4.17E-05		ND	-	-
CHRYSENE	1.11E-05	2.21E-05	5.80E+00		6.46E-05	1.28E-04	2.60E-05	5.16E-05		ND	-	-
FLUORANTHENE	2.53E-05	5.16E-05		ND	-	-	5.90E-05	1.20E-04	4.00E-02		1.48E-03	3.01E-03
PERYLENE	4.41E-06	9.40E-06		ND	-	-	1.03E-05	2.19E-05		ND	-	-
PHENANTHRENE	1.13E-05	3.08E-05		ND	-	-	2.65E-05	7.18E-05	4.00E-03		6.62E-03	1.80E-02
PYRENE	2.50E-05	4.85E-05		ND	-	-	5.83E-05	1.13E-04	3.00E-02		1.94E-03	3.77E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.04E-05	5.44E-05	7.70E+00		3.11E-04	4.19E-04	9.42E-05	1.27E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					4.37E-03	6.13E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.06E+01	2.85E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-23
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
INORGANICS										
ALUMINUM	6.58E-02	1.38E-01	ND	-	-	1.53E-01	3.21E-01	2.90E+00	5.29E-02	1.11E-01
ARSENIC	1.68E-03	3.15E-03	1.75E+00	2.95E-03	5.51E-03	3.93E-03	7.35E-03	3.00E-04	1.31E+01	2.45E+01
CADMIUM	4.99E-04	8.01E-04	ND	-	-	1.17E-03	1.87E-03	1.00E-03	1.17E+00	1.87E+00
CHROMIUM	8.62E-04	1.14E-03	ND	-	-	2.01E-03	2.66E-03	5.00E-03	4.02E-01	5.32E-01
COPPER	2.02E-03	7.38E-03	ND	-	-	4.72E-03	1.72E-02	3.70E-02	1.28E-01	4.66E-01
IRON	1.48E-01	3.00E-01	ND	-	-	3.45E-01	7.00E-01	ND	-	-
LEAD	2.38E-03	7.28E-03	ND	-	-	5.55E-03	1.70E-02	ND	-	-
MANGANESE	4.03E-03	1.90E-02	ND	-	-	9.41E-03	4.43E-02	1.00E-01	9.41E-02	4.43E-01
MERCURY	1.08E-04	2.56E-04	ND	-	-	2.52E-04	5.97E-04	3.00E-04	8.41E-01	1.99E+00
NICKEL	4.50E-04	8.19E-04	ND	-	-	1.05E-03	1.91E-03	2.00E-02	5.25E-02	9.55E-02
SILVER	5.64E-05	6.77E-04	ND	-	-	1.32E-04	1.58E-03	5.00E-03	2.63E-02	3.16E-01
ZINC	2.80E-02	5.85E-02	ND	-	-	6.52E-02	1.37E-01	2.00E-01	3.26E-01	6.83E-01
PESTICIDES										
ALDRIN	4.01E-07	1.05E-06	1.70E+01	6.82E-06	1.78E-05	9.36E-07	2.45E-06	3.00E-05	3.12E-02	8.16E-02
ALPHA-CHLORDANE	5.95E-07	1.90E-06	1.30E+00	7.73E-07	2.47E-06	1.39E-06	4.43E-06	6.00E-05	2.31E-02	7.38E-02
HEPTACHLOR EPOXIDE	7.70E-08	5.90E-07	9.10E+00	7.00E-07	5.37E-06	1.80E-07	1.38E-06	1.30E-05	1.38E-02	1.06E-01
LINDANE (GAMMA-BHC)	5.55E-07	9.66E-06	1.30E+00	7.22E-07	1.26E-05	1.30E-06	2.25E-05	3.00E-04	4.32E-03	7.51E-02
TRANS-NONACHLOR	5.85E-07	1.28E-06	ND	-	-	1.37E-06	2.99E-06	ND	-	-
o,p'-DDD	3.10E-07	1.90E-06	ND	-	-	7.24E-07	4.44E-06	ND	-	-
o,p'-DDE	1.98E-07	4.01E-07	ND	-	-	4.63E-07	9.36E-07	ND	-	-
o,p'-DDT	9.12E-07	8.10E-06	ND	-	-	2.13E-06	1.89E-05	ND	-	-
p,p'-DDD	2.01E-06	5.31E-06	2.40E-01	4.82E-07	1.27E-06	4.69E-06	1.24E-05	ND	-	-
p,p'-DDE	2.49E-06	4.74E-06	3.40E-01	8.46E-07	1.61E-06	5.81E-06	1.11E-05	ND	-	-
p,p'-DDT	3.11E-06	1.65E-05	3.40E-01	1.06E-06	5.62E-06	7.26E-06	3.86E-05	5.00E-04	1.45E-02	7.72E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-23
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	4.04E-06	1.51E-05		ND	-	-	9.43E-06	3.53E-05	3.00E-01		3.14E-05	1.18E-04
BENZO(E)PYRENE	8.30E-06	1.78E-05		ND	-	-	1.94E-05	4.16E-05		ND	-	-
CHRYSENE	8.70E-06	1.69E-05	5.80E+00		5.05E-05	9.82E-05	2.03E-05	3.95E-05		ND	-	-
FLUORANTHENE	2.07E-05	3.25E-05		ND	-	-	4.82E-05	7.59E-05	4.00E-02		1.21E-03	1.90E-03
PERYLENE	4.42E-06	9.80E-06		ND	-	-	1.03E-05	2.29E-05		ND	-	-
PHENANTHRENE	8.15E-06	1.32E-05		ND	-	-	1.90E-05	3.07E-05	4.00E-03		4.75E-03	7.67E-03
PYRENE	1.88E-05	3.10E-05		ND	-	-	4.38E-05	7.23E-05	3.00E-02		1.46E-03	2.41E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.58E-05	1.13E-04	7.70E+00		3.53E-04	8.71E-04	1.07E-04	2.64E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.36E-03	6.53E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.63E+01	3.14E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-24
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	7.12E-02	1.10E-01		ND	-	-	1.66E-01	2.56E-01	2.90E+00		5.73E-02	8.82E-02
ARSENIC	2.64E-03	5.13E-03	1.75E+00		4.63E-03	8.98E-03	6.17E-03	1.20E-02	3.00E-04		2.06E+01	3.99E+01
CADMIUM	5.39E-04	6.77E-04		ND	-	-	1.26E-03	1.58E-03	1.00E-03		1.26E+00	1.58E+00
CHROMIUM	1.05E-03	1.41E-03		ND	-	-	2.46E-03	3.29E-03	5.00E-03		4.92E-01	6.57E-01
COPPER	2.04E-03	2.96E-03		ND	-	-	4.76E-03	6.90E-03	3.70E-02		1.29E-01	1.87E-01
IRON	1.54E-01	2.25E-01		ND	-	-	3.59E-01	5.26E-01		ND	-	-
LEAD	2.64E-03	4.33E-03		ND	-	-	6.17E-03	1.01E-02		ND	-	-
MANGANESE	4.50E-03	1.33E-02		ND	-	-	1.05E-02	3.10E-02	1.00E-01		1.05E-01	3.10E-01
MERCURY	8.76E-05	1.36E-04		ND	-	-	2.04E-04	3.16E-04	3.00E-04		6.81E-01	1.05E+00
NICKEL	5.82E-04	1.09E-03		ND	-	-	1.36E-03	2.55E-03	2.00E-02		6.80E-02	1.27E-01
SILVER	2.39E-04	9.51E-04		ND	-	-	5.58E-04	2.22E-03	5.00E-03		1.12E-01	4.44E-01
ZINC	3.24E-02	4.31E-02		ND	-	-	7.55E-02	1.01E-01	2.00E-01		3.77E-01	5.03E-01
PESTICIDES												
ALDRIN	4.15E-07	8.42E-07	1.70E+01		7.06E-06	1.43E-05	9.69E-07	1.96E-06	3.00E-05		3.23E-02	6.55E-02
ALPHA-CHLORDANE	1.25E-06	2.69E-06	1.30E+00		1.63E-06	3.50E-06	2.92E-06	6.28E-06	6.00E-05		4.87E-02	1.05E-01
HEPTACHLOR	1.35E-07	4.67E-08	4.50E+00		6.09E-07	2.10E-07	3.16E-07	1.09E-07	5.00E-04		6.31E-04	2.18E-04
HEPTACHLOR EPOXIDE	7.23E-08	1.40E-08	9.10E+00		6.58E-07	1.27E-07	1.69E-07	3.27E-08	1.30E-05		1.30E-02	2.51E-03
HEXACHLOROBENZENE	2.24E-07	7.70E-08	1.60E+00		3.58E-07	1.23E-07	5.23E-07	1.80E-07	8.00E-04		6.53E-04	2.25E-04
LINDANE (GAMMA-BHC)	1.31E-07	3.59E-07	1.30E+00		1.70E-07	4.67E-07	3.05E-07	8.38E-07	3.00E-04		1.02E-03	2.79E-03
MIREX	1.61E-07	3.45E-07	1.80E+00		2.90E-07	6.21E-07	3.76E-07	8.06E-07	2.00E-04		1.88E-03	4.03E-03
TRANS-NONACHLOR	1.12E-06	2.81E-06		ND	-	-	2.62E-06	6.56E-06		ND	-	-
o,p'-DDD	9.45E-07	3.18E-06		ND	-	-	2.20E-06	7.43E-06		ND	-	-
o,p'-DDE	1.73E-07	1.98E-07		ND	-	-	4.03E-07	4.63E-07		ND	-	-
o,p'-DDT	5.48E-07	1.43E-06		ND	-	-	1.28E-06	3.34E-06		ND	-	-
p,p'-DDD	5.98E-06	1.64E-05	2.40E-01		1.43E-06	3.94E-06	1.40E-05	3.84E-05		ND	-	-
p,p'-DDE	4.04E-06	1.07E-05	3.40E-01		1.37E-06	3.63E-06	9.42E-06	2.49E-05		ND	-	-
p,p'-DDT	2.37E-06	5.35E-06	3.40E-01		8.06E-07	1.82E-06	5.53E-06	1.25E-05	5.00E-04		1.11E-02	2.50E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-24
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
POLYAROMATIC HYDROCARBONS												
BENZO(A)ANTHRACENE	5.13E-06	1.40E-05	5.80E+00		2.98E-05	8.14E-05	1.20E-05	3.28E-05		ND	-	-
BENZO(E)PYRENE	1.50E-05	3.08E-05		ND	-	-	3.49E-05	7.18E-05		ND	-	-
CHRYSENE	1.08E-05	2.10E-05	5.80E+00		6.25E-05	1.22E-04	2.51E-05	4.90E-05		ND	-	-
FLUORANTHENE	2.62E-05	6.30E-05		ND	-	-	6.10E-05	1.47E-04	4.00E-02		1.53E-03	3.67E-03
PERYLENE	4.76E-06	9.14E-06		ND	-	-	1.11E-05	2.13E-05		ND	-	-
PHENANTHRENE	6.42E-06	1.22E-05		ND	-	-	1.50E-05	2.86E-05	4.00E-03		3.75E-03	7.14E-03
PYRENE	2.58E-05	5.60E-05		ND	-	-	6.03E-05	1.31E-04	3.00E-02		2.01E-03	4.35E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	6.63E-05	1.40E-04	7.70E+00		5.11E-04	1.08E-03	1.55E-04	3.27E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.25E-03	1.03E-02	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.40E+01	4.51E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-25
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	5.82E-02	7.94E-02		ND	-	-	1.36E-01	1.85E-01	2.90E+00		4.68E-02	6.39E-02
ARSENIC	1.29E-03	2.26E-03	1.75E+00		2.25E-03	3.96E-03	3.00E-03	5.28E-03	3.00E-04		1.00E+01	1.76E+01
CADMIUM	4.46E-04	5.03E-04		ND	-	-	1.04E-03	1.17E-03	1.00E-03		1.04E+00	1.17E+00
CHROMIUM	6.14E-04	7.90E-04		ND	-	-	1.43E-03	1.84E-03	5.00E-03		2.87E-01	3.69E-01
COPPER	2.01E-03	2.23E-03		ND	-	-	4.68E-03	5.20E-03	3.70E-02		1.27E-01	1.40E-01
IRON	1.18E-01	1.45E-01		ND	-	-	2.76E-01	3.38E-01		ND	-	-
LEAD	6.12E-04	8.98E-04		ND	-	-	1.43E-03	2.10E-03		ND	-	-
MANGANESE	2.77E-03	3.38E-03		ND	-	-	6.47E-03	7.89E-03	1.00E-01		6.47E-02	7.89E-02
MERCURY	9.86E-05	1.58E-04		ND	-	-	2.30E-04	3.69E-04	3.00E-04		7.67E-01	1.23E+00
NICKEL	3.61E-04	4.67E-04		ND	-	-	8.43E-04	1.09E-03	2.00E-02		4.22E-02	5.45E-02
SILVER	3.11E-05	4.22E-05		ND	-	-	7.25E-05	9.85E-05	5.00E-03		1.45E-02	1.97E-02
ZINC	2.66E-02	3.02E-02		ND	-	-	6.20E-02	7.06E-02	2.00E-01		3.10E-01	3.53E-01
PESTICIDES												
ALDRIN	2.02E-07	4.62E-07	1.70E+01		3.44E-06	7.85E-06	4.72E-07	1.08E-06	3.00E-05		1.57E-02	3.59E-02
ALPHA-CHLORDANE	8.98E-07	2.36E-06	1.30E+00		1.17E-06	3.06E-06	2.10E-06	5.50E-06	6.00E-05		3.49E-02	9.17E-02
HEPTACHLOR	5.36E-07	1.78E-06	4.50E+00		2.41E-06	8.03E-06	1.25E-06	4.16E-06	5.00E-04		2.50E-03	8.33E-03
TRANS-NONACHLOR	1.34E-06	2.72E-06		ND	-	-	3.12E-06	6.35E-06		ND	-	-
o,p'-DDD	7.14E-07	1.24E-06		ND	-	-	1.67E-06	2.88E-06		ND	-	-
o,p'-DDT	2.39E-07	5.48E-07		ND	-	-	5.57E-07	1.28E-06		ND	-	-
p,p'-DDD	1.83E-06	2.33E-06	2.40E-01		4.38E-07	5.59E-07	4.26E-06	5.43E-06		ND	-	-
p,p'-DDE	1.70E-06	2.09E-06	3.40E-01		5.78E-07	7.10E-07	3.97E-06	4.87E-06		ND	-	-
p,p'-DDT	2.58E-06	6.90E-06	3.40E-01		8.76E-07	2.34E-06	6.01E-06	1.61E-05	5.00E-04		1.20E-02	3.22E-02
POLYAROMATIC HYDROCARBONS												
FLUORANTHENE	1.17E-05	1.64E-05		ND	-	-	2.72E-05	3.84E-05	4.00E-02		6.81E-04	9.59E-04
PHENANTHRENE	8.05E-06	1.50E-05		ND	-	-	1.88E-05	3.51E-05	4.00E-03		4.70E-03	8.78E-03
PYRENE	7.48E-06	1.33E-05		ND	-	-	1.74E-05	3.10E-05	3.00E-02		5.81E-04	1.03E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	3.19E-05	3.88E-05	7.70E+00		2.46E-04	2.99E-04	7.44E-05	9.05E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					2.50E-03	4.28E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.28E+01	2.13E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-26
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS FOR SUBSISTENCE FISHING RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
INORGANICS												
ALUMINUM	1.03E-01	1.55E-01		ND	–	–	2.40E-01	3.61E-01	2.90E+00		8.27E-02	1.24E-01
ARSENIC	2.55E-03	4.15E-03	1.75E+00		4.47E-03	7.27E-03	5.95E-03	9.69E-03	3.00E-04		1.98E+01	3.23E+01
CADMIUM	6.44E-04	9.83E-04		ND	–	–	1.50E-03	2.29E-03	1.00E-03		1.50E+00	2.29E+00
CHROMIUM	1.44E-03	1.97E-03		ND	–	–	3.35E-03	4.59E-03	5.00E-03		6.70E-01	9.17E-01
COPPER	2.28E-03	2.62E-03		ND	–	–	5.33E-03	6.11E-03	3.70E-02		1.44E-01	1.65E-01
IRON	2.08E-01	2.85E-01		ND	–	–	4.84E-01	6.64E-01		ND	–	–
LEAD	1.23E-03	1.54E-03		ND	–	–	2.87E-03	3.60E-03		ND	–	–
MANGANESE	1.34E-02	2.63E-02		ND	–	–	3.12E-02	6.13E-02	1.00E-01		3.12E-01	6.13E-01
MERCURY	9.38E-05	1.33E-04		ND	–	–	2.19E-04	3.10E-04	3.00E-04		7.29E-01	1.03E+00
NICKEL	6.30E-04	7.18E-04		ND	–	–	1.47E-03	1.68E-03	2.00E-02		7.36E-02	8.38E-02
SILVER	4.81E-04	6.40E-04		ND	–	–	1.12E-03	1.49E-03	5.00E-03		2.25E-01	2.99E-01
ZINC	3.45E-02	4.37E-02		ND	–	–	8.05E-02	1.02E-01	2.00E-01		4.02E-01	5.10E-01
PESTICIDES												
ALDRIN	6.13E-07	6.88E-07	1.70E+01		1.04E-05	1.17E-05	1.43E-06	1.61E-06	3.00E-05		4.77E-02	5.35E-02
ALPHA-CHLORDANE	1.68E-06	2.26E-06	1.30E+00		2.18E-06	2.94E-06	3.92E-06	5.27E-06	6.00E-05		6.53E-02	8.79E-02
LINDANE (GAMMA-BHC)	3.08E-07	1.19E-06	1.30E+00		4.00E-07	1.55E-06	7.18E-07	2.78E-06	3.00E-04		2.39E-03	9.27E-03
TRANS-NONACHLOR	1.38E-06	2.02E-06		ND	–	–	3.21E-06	4.72E-06		ND	–	–
o,p'-DDD	6.30E-07	1.16E-06		ND	–	–	1.47E-06	2.70E-06		ND	–	–
o,p'-DDT	2.10E-07	5.69E-07		ND	–	–	4.90E-07	1.33E-06		ND	–	–
p,p'-DDD	3.84E-06	5.82E-06	2.40E-01		9.21E-07	1.40E-06	8.95E-06	1.36E-05		ND	–	–
p,p'-DDE	5.61E-06	1.05E-05	3.40E-01		1.91E-06	3.56E-06	1.31E-05	2.44E-05		ND	–	–
p,p'-DDT	1.47E-06	3.75E-06	3.40E-01		5.01E-07	1.28E-06	3.44E-06	8.76E-06	5.00E-04		6.88E-03	1.75E-02

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-26
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
BENZO(A)ANTHRACENE	1.38E-05	2.80E-05	5.80E+00		8.01E-05	1.62E-04	3.22E-05	6.53E-05		ND	-	-
BENZO(A)PYRENE	1.62E-05	2.80E-05	5.80E+00		9.38E-05	1.62E-04	3.77E-05	6.53E-05		ND	-	-
BENZO(E)PYRENE	3.51E-05	6.53E-05		ND	-	-	8.18E-05	1.52E-04		ND	-	-
CHRYSENE	2.13E-05	3.73E-05	5.80E+00		1.24E-04	2.16E-04	4.98E-05	8.71E-05		ND	-	-
FLUORANTHENE	2.73E-05	4.20E-05		ND	-	-	6.36E-05	9.80E-05	4.00E-02		1.59E-03	2.45E-03
PERYLENE	1.69E-05	2.57E-05		ND	-	-	3.94E-05	5.99E-05		ND	-	-
PHENANTHRENE	3.69E-06	9.75E-06		ND	-	-	8.62E-06	2.28E-05	4.00E-03		2.15E-03	5.69E-03
PYRENE	4.10E-05	8.16E-05		ND	-	-	9.56E-05	1.91E-04	3.00E-02		3.19E-03	6.35E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	2.10E-05	8.47E-05	7.70E+00		1.62E-04	6.52E-04	4.90E-05	1.98E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					4.94E-03	8.48E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.41E+01	3.85E+01

NOTES:

ND – NO DATA AVAILABLE

TABLE 5-27
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	5.04E-04	8.50E-04		ND	-	-	1.18E-03	1.98E-03	2.90E+00		4.06E-04	6.84E-04
ARSENIC	4.67E-04	5.55E-04	1.75E+00		8.17E-04	9.71E-04	1.09E-03	1.29E-03	3.00E-04		3.63E+00	4.32E+00
CADMIUM	1.42E-06	3.71E-06		ND	-	-	3.31E-06	8.65E-06	1.00E-03		3.31E-03	8.65E-03
CHROMIUM	5.87E-05	1.03E-04		ND	-	-	1.37E-04	2.40E-04	5.00E-03		2.74E-02	4.81E-02
COPPER	7.42E-05	1.11E-04		ND	-	-	1.73E-04	2.60E-04	3.70E-02		4.68E-03	7.02E-03
IRON	1.26E-03	2.04E-03		ND	-	-	2.95E-03	4.76E-03		ND	-	-
LEAD	1.23E-05	3.01E-05		ND	-	-	2.87E-05	7.03E-05		ND	-	-
MANGANESE	9.26E-05	2.46E-04		ND	-	-	2.16E-04	5.73E-04	1.00E-01		2.16E-03	5.73E-03
MERCURY	6.94E-06	1.11E-05		ND	-	-	1.62E-05	2.60E-05	3.00E-04		5.40E-02	8.65E-02
NICKEL	4.58E-05	5.60E-05		ND	-	-	1.07E-04	1.31E-04	2.00E-02		5.34E-03	6.53E-03
SILVER	1.86E-06	4.50E-06		ND	-	-	4.33E-06	1.05E-05	5.00E-03		8.67E-04	2.10E-03
ZINC	2.38E-03	3.34E-03		ND	-	-	5.56E-03	7.79E-03	2.00E-01		2.78E-02	3.89E-02
PESTICIDES												
ALDRIN	8.33E-08	1.90E-07	1.70E+01		1.42E-06	3.23E-06	1.94E-07	4.44E-07	3.00E-05		6.48E-03	1.48E-02
ALPHA-CHLORDANE	9.62E-08	2.70E-07	1.30E+00		1.25E-07	3.51E-07	2.25E-07	6.30E-07	6.00E-05		3.74E-03	1.05E-02
HEPTACHLOR	6.34E-08	1.90E-07	4.50E+00		2.85E-07	8.56E-07	1.48E-07	4.44E-07	5.00E-04		2.96E-04	8.88E-04
HEPTACHLOR EPOXIDE	5.27E-08	1.90E-07	9.10E+00		4.79E-07	1.73E-06	1.23E-07	4.44E-07	1.30E-05		9.45E-03	3.41E-02
HEXACHLOROBENZENE	2.34E-07	7.61E-07	1.60E+00		3.74E-07	1.22E-06	5.46E-07	1.78E-06	8.00E-04		6.82E-04	2.22E-03
LINDANE (GAMMA-BHC)	5.65E-08	1.90E-07	1.30E+00		7.35E-08	2.47E-07	1.32E-07	4.44E-07	3.00E-04		4.39E-04	1.48E-03
MIREX	6.29E-08	1.90E-07	1.80E+00		1.13E-07	3.42E-07	1.47E-07	4.44E-07	2.00E-04		7.34E-04	2.22E-03
TRANS-NONACHLOR	1.88E-07	4.23E-07		ND	-	-	4.38E-07	9.87E-07		ND	-	-
o,p'-DDD	8.62E-08	1.90E-07		ND	-	-	2.01E-07	4.44E-07		ND	-	-
o,p'-DDE	6.72E-08	1.90E-07		ND	-	-	1.57E-07	4.44E-07		ND	-	-
o,p'-DDT	1.31E-07	2.82E-07		ND	-	-	3.06E-07	6.57E-07		ND	-	-
p,p'-DDD	2.29E-07	8.75E-07	2.40E-01		5.50E-08	2.10E-07	5.35E-07	2.04E-06		ND	-	-
p,p'-DDE	9.48E-07	2.99E-06	3.40E-01		3.22E-07	1.02E-06	2.21E-06	6.98E-06		ND	-	-
p,p'-DDT	3.97E-07	1.68E-06	3.40E-01		1.35E-07	5.72E-07	9.26E-07	3.93E-06	5.00E-04		1.85E-03	7.85E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	1.07E-05	2.53E-05	7.70E+00		8.23E-05	1.95E-04	2.49E-05	5.91E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					9.03E-04	1.18E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				3.78E+00	4.59E+00

NOTES:
ND - NO DATA AVAILABLE

TABLE 5-28
POTENTIAL RISK CALCULATED FOR THE CONSUMPTION OF FLOUNDER FILLET
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RECREATIONAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS							NONCARCINOGENIC RISKS						
	CHRONIC DAILY INTAKE (mg/kg/day)			ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)			RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX		(mg/kg/day)-1		AVG	MAX	AVG	MAX		(mg/kg/day)		AVG	MAX
INORGANICS														
ALUMINUM	2.86E-04	2.86E-04	*		ND	-	-	6.68E-04	6.68E-04	*	2.90E+00		2.30E-04	2.30E-04
ARSENIC	4.22E-04	4.22E-04	*	1.75E+00		7.38E-04	7.38E-04	9.84E-04	9.84E-04	*	3.00E-04		3.28E+00	3.28E+00
CHROMIUM	3.82E-05	3.82E-05	*		ND	-	-	8.91E-05	8.91E-05	*	5.00E-03		1.78E-02	1.78E-02
COPPER	4.70E-05	4.70E-05	*		ND	-	-	1.10E-04	1.10E-04	*	3.70E-02		2.96E-03	2.96E-03
IRON	6.40E-04	6.40E-04	*		ND	-	-	1.49E-03	1.49E-03	*		ND	-	-
LEAD	3.49E-06	3.49E-06	*		ND	-	-	8.14E-06	8.14E-06	*		ND	-	-
MANGANESE	2.66E-05	2.66E-05	*		ND	-	-	6.21E-05	6.21E-05	*	1.00E-01		6.21E-04	6.21E-04
MERCURY	6.12E-06	6.12E-06	*		ND	-	-	1.43E-05	1.43E-05	*	3.00E-04		4.76E-02	4.76E-02
NICKEL	3.68E-05	3.68E-05	*		ND	-	-	8.59E-05	8.59E-05	*	2.00E-02		4.29E-03	4.29E-03
SILVER	2.73E-06	2.73E-06	*		ND	-	-	6.36E-06	6.36E-06	*	5.00E-03		1.27E-03	1.27E-03
ZINC	1.66E-03	1.66E-03	*		ND	-	-	3.88E-03	3.88E-03	*	2.00E-01		1.94E-02	1.94E-02
PESTICIDES														
ALDRIN	1.17E-07	1.84E-07	*	1.70E+01		1.99E-06	3.12E-06	2.73E-07	4.29E-07	*	3.00E-05		9.09E-03	1.43E-02
ALPHA-CHLORDANE	4.92E-08	5.13E-08	*	1.30E+00		6.39E-08	6.66E-08	1.15E-07	1.20E-07	*	6.00E-05		1.91E-03	1.99E-03
HEPTACHLOR	4.71E-08	4.71E-08	*	4.50E+00		2.12E-07	2.12E-07	1.10E-07	1.10E-07	*	5.00E-04		2.20E-04	2.20E-04
HEPTACHLOR EPOXIDE	9.67E-09	1.10E-08		9.10E+00		8.80E-08	1.00E-07	2.26E-08	2.57E-08		1.30E-05		1.74E-03	1.98E-03
HEXACHLOROBENZENE	4.09E-08	5.03E-08		1.60E+00		6.55E-08	8.05E-08	9.55E-08	1.17E-07		8.00E-04		1.19E-04	1.47E-04
LINDANE (GAMMA-BHC)	1.98E-08	2.32E-08		1.30E+00		2.58E-08	3.02E-08	4.62E-08	5.42E-08		3.00E-04		1.54E-04	1.81E-04
MIREX	4.71E-08	4.71E-08	*	1.80E+00		8.47E-08	8.47E-08	1.10E-07	1.10E-07	*	2.00E-04		5.49E-04	5.49E-04
TRANS-NONACHLOR	7.34E-08	9.98E-08			ND	-	-	1.71E-07	2.33E-07			ND	-	-
o,p'-DDD	4.71E-08	4.71E-08	*		ND	-	-	1.10E-07	1.10E-07	*		ND	-	-
o,p'-DDE	4.46E-08	4.71E-08			ND	-	-	1.04E-07	1.10E-07			ND	-	-
o,p'-DDT	1.64E-07	2.82E-07			ND	-	-	3.84E-07	6.57E-07			ND	-	-
p,p'-DDD	3.20E-08	4.71E-08		2.40E-01		7.68E-09	1.13E-08	7.47E-08	1.10E-07			ND	-	-
p,p'-DDE	2.12E-07	2.57E-07		3.40E-01		7.20E-08	8.74E-08	4.94E-07	6.00E-07			ND	-	-
p,p'-DDT	8.78E-07	1.68E-06		3.40E-01		2.99E-07	5.72E-07	2.05E-06	3.93E-06		5.00E-04		4.10E-03	7.85E-03
POLYCHLORINATED BIPHENYLS (PCBs)														
TOTAL PCBs (AROCHLOR)	4.55E-06	5.85E-06		7.70E+00		3.51E-05	4.50E-05	1.06E-05	1.36E-05			ND		
						AVG	MAX						AVG	MAX
CUMULATIVE CARCINOGENIC RISK:						7.76E-04	7.87E-04	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:					3.39E+00	3.40E+00

NOTES:

ND : NO DATA AVAILABLE

* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-29
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET CAUGHT AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	3.44E-04	3.96E-04		ND	-	-	8.03E-04	9.25E-04	2.90E+00		2.77E-04	3.19E-04
ARSENIC	5.34E-04	5.55E-04	1.75E+00		9.35E-04	9.71E-04	1.25E-03	1.29E-03	3.00E-04		4.15E+00	4.32E+00
CHROMIUM	7.50E-05	1.03E-04		ND	-	-	1.75E-04	2.40E-04	5.00E-03		3.50E-02	4.81E-02
COPPER	7.33E-05	7.69E-05		ND	-	-	1.71E-04	1.79E-04	3.70E-02		4.62E-03	4.85E-03
IRON	8.99E-04	1.20E-03		ND	-	-	2.10E-03	2.79E-03		ND	-	-
LEAD	1.76E-05	3.01E-05		ND	-	-	4.11E-05	7.03E-05		ND	-	-
MANGANESE	1.33E-04	2.46E-04		ND	-	-	3.11E-04	5.73E-04	1.00E-01		3.11E-03	5.73E-03
MERCURY	4.28E-06	6.97E-06		ND	-	-	9.99E-06	1.63E-05	3.00E-04		3.33E-02	5.42E-02
NICKEL	4.39E-05	4.82E-05		ND	-	-	1.02E-04	1.12E-04	2.00E-02		5.12E-03	5.62E-03
ZINC	2.76E-03	3.34E-03		ND	-	-	6.44E-03	7.79E-03	2.00E-01		3.22E-02	3.89E-02
PESTICIDES												
ALDRIN	1.27E-07	1.90E-07	1.70E+01		2.16E-06	3.23E-06	2.96E-07	4.44E-07	3.00E-05		9.86E-03	1.48E-02
ALPHA-CHLORDANE	1.27E-07	1.90E-07	1.30E+00		1.65E-07	2.47E-07	2.96E-07	4.44E-07	6.00E-05		4.93E-03	7.40E-03
HEPTACHLOR	1.27E-07	1.90E-07	4.50E+00		5.71E-07	8.56E-07	2.96E-07	4.44E-07	5.00E-04		5.92E-04	8.88E-04
HEPTACHLOR EPOXIDE	1.27E-07	1.90E-07	9.10E+00		1.15E-06	1.73E-06	2.96E-07	4.44E-07	1.30E-05		2.28E-02	3.41E-02
HEXACHLOROBENZENE	5.07E-07	7.61E-07	1.60E+00		8.12E-07	1.22E-06	1.18E-06	1.78E-06	8.00E-04		1.48E-03	2.22E-03
LINDANE (GAMMA-BHC)	1.27E-07	1.90E-07	1.30E+00		1.65E-07	2.47E-07	2.96E-07	4.44E-07	3.00E-04		9.86E-04	1.48E-03
MIREX	1.27E-07	1.90E-07	1.80E+00		2.28E-07	3.42E-07	2.96E-07	4.44E-07	2.00E-04		1.48E-03	2.22E-03
TRANS-NONACHLOR	2.54E-07	3.49E-07		ND	-	-	5.92E-07	8.14E-07		ND	-	-
o,p'-DDD	1.27E-07	1.90E-07		ND	-	-	2.96E-07	4.44E-07		ND	-	-
o,p'-DDE	1.27E-07	1.90E-07		ND	-	-	2.96E-07	4.44E-07		ND	-	-
o,p'-DDT	1.27E-07	1.90E-07		ND	-	-	2.96E-07	4.44E-07		ND	-	-
p,p'-DDD	1.27E-07	1.90E-07	2.40E-01		3.04E-08	4.57E-08	2.96E-07	4.44E-07		ND	-	-
p,p'-DDE	1.11E-06	1.68E-06	3.40E-01		3.77E-07	5.71E-07	2.59E-06	3.92E-06		ND	-	-
p,p'-DDT	1.27E-07	1.90E-07	3.40E-01		4.31E-08	6.47E-08	2.96E-07	4.44E-07	5.00E-04		5.92E-04	8.88E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	1.36E-05	1.98E-05	7.70E+00		1.05E-04	1.52E-04	3.17E-05	4.62E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.05E-03	1.13E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				4.31E+00	4.54E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-30
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1	CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)	CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS										
ALUMINUM	6.84E-04	8.50E-04	ND	-	-	1.60E-03	1.98E-03	2.90E+00	5.50E-04	6.84E-04
ARSENIC	4.37E-04	5.20E-04	1.75E+00	7.66E-04	9.10E-04	1.02E-03	1.21E-03	3.00E-04	3.40E+00	4.04E+00
CADMIUM	1.88E-06	3.71E-06	ND	-	-	4.38E-06	8.65E-06	1.00E-03	4.38E-03	8.65E-03
CHROMIUM	5.47E-05	8.16E-05	ND	-	-	1.28E-04	1.90E-04	5.00E-03	2.55E-02	3.81E-02
COPPER	8.39E-05	1.11E-04	ND	-	-	1.96E-04	2.60E-04	3.70E-02	5.29E-03	7.02E-03
IRON	1.72E-03	2.04E-03	ND	-	-	4.01E-03	4.76E-03	ND	-	-
LEAD	1.17E-05	1.55E-05	ND	-	-	2.74E-05	3.62E-05	ND	-	-
MANGANESE	8.74E-05	1.85E-04	ND	-	-	2.04E-04	4.33E-04	1.00E-01	2.04E-03	4.33E-03
MERCURY	1.00E-05	1.11E-05	ND	-	-	2.33E-05	2.60E-05	3.00E-04	7.78E-02	8.65E-02
NICKEL	5.00E-05	5.60E-05	ND	-	-	1.17E-04	1.31E-04	2.00E-02	5.84E-03	6.53E-03
SILVER	2.07E-06	4.50E-06	ND	-	-	4.82E-06	1.05E-05	5.00E-03	9.64E-04	2.10E-03
ZINC	2.37E-03	3.05E-03	ND	-	-	5.53E-03	7.11E-03	2.00E-01	2.77E-02	3.56E-02
PESTICIDES										
ALDRIN	3.82E-08	4.76E-08	1.70E+01	6.50E-07	8.08E-07	8.92E-08	1.11E-07	3.00E-05	2.97E-03	3.70E-03
ALPHA-CHLORDANE	1.14E-07	2.70E-07	1.30E+00	1.48E-07	3.51E-07	2.65E-07	6.30E-07	6.00E-05	4.42E-03	1.05E-02
HEPTACHLOR	3.82E-08	4.76E-08	4.50E+00	1.72E-07	2.14E-07	8.92E-08	1.11E-07	5.00E-04	1.78E-04	2.22E-04
HEPTACHLOR EPOXIDE	3.82E-08	4.76E-08	9.10E+00	3.48E-07	4.33E-07	8.92E-08	1.11E-07	1.30E-05	6.86E-03	8.54E-03
HEXACHLOROBENZENE	1.76E-07	3.72E-07	1.60E+00	2.81E-07	5.95E-07	4.10E-07	8.68E-07	8.00E-04	5.13E-04	1.08E-03
LINDANE (GAMMA-BHC)	3.24E-08	4.37E-08	1.30E+00	4.21E-08	5.69E-08	7.56E-08	1.02E-07	3.00E-04	2.52E-04	3.40E-04
MIREX	3.71E-08	4.76E-08	1.80E+00	6.68E-08	8.56E-08	8.66E-08	1.11E-07	2.00E-04	4.33E-04	5.55E-04
TRANS-NONACHLOR	2.29E-07	4.23E-07	ND	-	-	5.34E-07	9.87E-07	ND	-	-
o,p'-DDD	9.42E-08	1.45E-07	ND	-	-	2.20E-07	3.37E-07	ND	-	-
o,p'-DDE	4.90E-08	9.76E-08	ND	-	-	1.14E-07	2.28E-07	ND	-	-
o,p'-DDT	1.18E-07	2.63E-07	ND	-	-	2.75E-07	6.13E-07	ND	-	-
p,p'-DDD	4.35E-07	8.75E-07	2.40E-01	1.04E-07	2.10E-07	1.02E-06	2.04E-06	ND	-	-
p,p'-DDE	1.33E-06	2.99E-06	3.40E-01	4.51E-07	1.02E-06	3.10E-06	6.98E-06	ND	-	-
p,p'-DDT	1.78E-07	2.55E-07	3.40E-01	6.06E-08	8.66E-08	4.16E-07	5.94E-07	5.00E-04	8.32E-04	1.19E-03
POLYCHLORINATED BIPHENYLS (PCBs)										
TOTAL PCBs (AROCHLOR)	1.28E-05	2.53E-05	7.70E+00	9.89E-05	1.95E-04	3.00E-05	5.91E-05	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				8.67E-04	1.11E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			3.57E+00	4.26E+00

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-31
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET CAUGHT AT YORK HARBOR SAMPLE LOCATIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
PESTICIDES												
ALPHA-CHLORDANE	1.24E-07	1.24E-07	1.30E+00		1.61E-07	1.61E-07	2.88E-07	2.88E-07	6.00E-05		4.81E-03	4.81E-03
TRANS-NONACHLOR	6.02E-08	6.02E-08		ND	-	-	1.41E-07	1.41E-07		ND	-	-
p,p'-DDD	1.11E-07	1.11E-07	2.40E-01		2.66E-08	2.66E-08	2.59E-07	2.59E-07		ND	-	-
p,p'-DDE	2.50E-07	2.50E-07	3.40E-01		8.52E-08	8.52E-08	5.84E-07	5.84E-07		ND	-	-
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.29E-06	4.48E-06	7.70E+00		3.30E-05	3.45E-05	1.00E-05	1.05E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.33E-05	3.48E-05	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				4.81E-03	4.81E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-32
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
INORGANICS												
ALUMINUM	1.23E-03	2.08E-03		ND	-	-	2.88E-03	4.85E-03	2.90E+00		9.92E-04	1.67E-03
ARSENIC	1.14E-03	1.36E-03	1.75E+00		2.00E-03	2.37E-03	2.66E-03	3.16E-03	3.00E-04		8.88E+00	1.05E+01
CADMIUM	3.47E-06	9.07E-06		ND	-	-	8.09E-06	2.12E-05	1.00E-03		8.09E-03	2.12E-02
CHROMIUM	1.43E-04	2.52E-04		ND	-	-	3.35E-04	5.88E-04	5.00E-03		6.70E-02	1.18E-01
COPPER	1.81E-04	2.72E-04		ND	-	-	4.23E-04	6.35E-04	3.70E-02		1.14E-02	1.72E-02
IRON	3.09E-03	4.98E-03		ND	-	-	7.21E-03	1.16E-02		ND	-	-
LEAD	3.01E-05	7.36E-05		ND	-	-	7.02E-05	1.72E-04		ND	-	-
MANGANESE	2.26E-04	6.01E-04		ND	-	-	5.28E-04	1.40E-03	1.00E-01		5.28E-03	1.40E-02
MERCURY	1.70E-05	2.72E-05		ND	-	-	3.96E-05	6.35E-05	3.00E-04		1.32E-01	2.12E-01
NICKEL	1.12E-04	1.37E-04		ND	-	-	2.61E-04	3.19E-04	2.00E-02		1.31E-02	1.60E-02
SILVER	4.54E-06	1.10E-05		ND	-	-	1.06E-05	2.57E-05	5.00E-03		2.12E-03	5.14E-03
ZINC	5.83E-03	8.16E-03		ND	-	-	1.36E-02	1.90E-02	2.00E-01		6.80E-02	9.52E-02
PESTICIDES												
ALDRIN	2.04E-07	4.65E-07	1.70E+01		3.46E-06	7.90E-06	4.75E-07	1.08E-06	3.00E-05		1.58E-02	3.62E-02
ALPHA-CHLORDANE	2.35E-07	6.59E-07	1.30E+00		3.06E-07	8.57E-07	5.49E-07	1.54E-06	6.00E-05		9.15E-03	2.56E-02
HEPTACHLOR	1.55E-07	4.65E-07	4.50E+00		6.97E-07	2.09E-06	3.61E-07	1.08E-06	5.00E-04		7.23E-04	2.17E-03
HEPTACHLOR EPOXIDE	1.29E-07	4.65E-07	9.10E+00		1.17E-06	4.23E-06	3.00E-07	1.08E-06	1.30E-05		2.31E-02	8.35E-02
HEXACHLOROBENZENE	5.71E-07	1.86E-06	1.60E+00		9.14E-07	2.98E-06	1.33E-06	4.34E-06	8.00E-04		1.67E-03	5.42E-03
LINDANE (GAMMA-BHC)	1.38E-07	4.65E-07	1.30E+00		1.80E-07	6.04E-07	3.22E-07	1.08E-06	3.00E-04		1.07E-03	3.62E-03
MIREX	1.54E-07	4.65E-07	1.80E+00		2.77E-07	8.37E-07	3.59E-07	1.08E-06	2.00E-04		1.79E-03	5.42E-03
TRANS-NONACHLOR	4.59E-07	1.03E-06		ND	-	-	1.07E-06	2.41E-06		ND	-	-
o,p'-DDD	2.11E-07	4.65E-07		ND	-	-	4.92E-07	1.08E-06		ND	-	-
o,p'-DDE	1.64E-07	4.65E-07		ND	-	-	3.84E-07	1.08E-06		ND	-	-
o,p'-DDT	3.20E-07	6.88E-07		ND	-	-	7.47E-07	1.61E-06		ND	-	-
p,p'-DDD	5.60E-07	2.14E-06	2.40E-01		1.34E-07	5.13E-07	1.31E-06	4.99E-06		ND	-	-
p,p'-DDE	2.32E-06	7.31E-06	3.40E-01		7.88E-07	2.48E-06	5.41E-06	1.71E-05		ND	-	-
p,p'-DDT	9.70E-07	4.11E-06	3.40E-01		3.30E-07	1.40E-06	2.26E-06	9.60E-06	5.00E-04		4.52E-03	1.92E-02
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	2.61E-05	6.19E-05	7.70E+00		2.01E-04	4.77E-04	6.10E-05	1.44E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					2.21E-03	2.87E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				9.25E+00	1.12E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-33
POTENTIAL RISK CALCULATED FOR THE CONSUMPTION OF FLOUNDER FILLET
CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
ANALYTE	CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1	CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)	CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS										
ALUMINUM	2.11E-03	2.11E-03 *	ND	–	–	4.91E-03	4.91E-03 *	2.90E+00	1.69E-03	1.69E-03
ARSENIC	3.10E-03	3.10E-03 *	1.75E+00	5.43E-03	5.43E-03	7.24E-03	7.24E-03 *	3.00E-04	2.41E+01	2.41E+01
CHROMIUM	2.81E-04	2.81E-04 *	ND	–	–	6.55E-04	6.55E-04 *	5.00E-03	1.31E-01	1.31E-01
COPPER	3.46E-04	3.46E-04 *	ND	–	–	8.07E-04	8.07E-04 *	3.70E-02	2.18E-02	2.18E-02
IRON	4.71E-03	4.71E-03 *	ND	–	–	1.10E-02	1.10E-02 *	ND	–	–
LEAD	2.57E-05	2.57E-05 *	ND	–	–	5.99E-05	5.99E-05 *	ND	–	–
MANGANESE	1.96E-04	1.96E-04 *	ND	–	–	4.57E-04	4.57E-04 *	1.00E-01	4.57E-03	4.57E-03
MERCURY	4.50E-05	4.50E-05 *	ND	–	–	1.05E-04	1.05E-04 *	3.00E-04	3.50E-01	3.50E-01
NICKEL	2.71E-04	2.71E-04 *	ND	–	–	6.32E-04	6.32E-04 *	2.00E-02	3.16E-02	3.16E-02
SILVER	2.01E-05	2.01E-05 *	ND	–	–	4.68E-05	4.68E-05 *	5.00E-03	9.36E-03	9.36E-03
ZINC	1.22E-02	1.22E-02 *	ND	–	–	2.86E-02	2.86E-02 *	2.00E-01	1.43E-01	1.43E-01
PESTICIDES										
ALDRIN	8.60E-07	1.35E-06	1.70E+01	1.46E-05	2.30E-05	2.01E-06	3.16E-06	3.00E-05	6.69E-02	1.05E-01
ALPHA-CHLORDANE	3.62E-07	3.77E-07	1.30E+00	4.70E-07	4.90E-07	8.44E-07	8.80E-07	6.00E-05	1.41E-02	1.47E-02
HEPTACHLOR	3.46E-07	3.46E-07 *	4.50E+00	1.56E-06	1.56E-06	8.08E-07	8.08E-07 *	5.00E-04	1.62E-03	1.62E-03
HEPTACHLOR EPOXIDE	7.11E-08	8.12E-08	9.10E+00	6.47E-07	7.39E-07	1.66E-07	1.89E-07	1.30E-05	1.28E-02	1.46E-02
HEXACHLOROBENZENE	3.01E-07	3.70E-07	1.60E+00	4.82E-07	5.93E-07	7.03E-07	8.64E-07	8.00E-04	8.78E-04	1.08E-03
LINDANE (GAMMA-BHC)	1.46E-07	1.71E-07	1.30E+00	1.90E-07	2.22E-07	3.40E-07	3.99E-07	3.00E-04	1.13E-03	1.33E-03
MIREX	3.46E-07	3.46E-07 *	1.80E+00	6.24E-07	6.24E-07	8.08E-07	8.08E-07 *	2.00E-04	4.04E-03	4.04E-03
TRANS-NONACHLOR	5.40E-07	7.34E-07	ND	–	–	1.26E-06	1.71E-06	ND	–	–
o,p'-DDD	3.46E-07	3.46E-07 *	ND	–	–	8.08E-07	8.08E-07 *	ND	–	–
o,p'-DDE	3.28E-07	3.46E-07	ND	–	–	7.65E-07	8.08E-07	ND	–	–
o,p'-DDT	1.21E-06	2.07E-06 *	ND	–	–	2.82E-06	4.84E-06 *	ND	–	–
p,p'-DDD	2.36E-07	3.46E-07	2.40E-01	5.65E-08	8.31E-08	5.50E-07	8.08E-07	ND	–	–
p,p'-DDE	1.56E-06	1.89E-06	3.40E-01	5.30E-07	6.43E-07	3.63E-06	4.41E-06	ND	–	–
p,p'-DDT	6.46E-06	1.24E-05	3.40E-01	2.20E-06	4.21E-06	1.51E-05	2.89E-05	5.00E-04	3.02E-02	5.78E-02
POLYCHLORINATED BIPHENYLS (PCBs)										
TOTAL PCBs (AROCHLOR)	3.35E-05	4.30E-05	7.70E+00	2.58E-04	3.31E-04	7.82E-05	1.00E-04	ND		
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				5.71E-03	5.79E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			2.50E+01	2.50E+01

NOTES:

ND : NO DATA AVAILABLE
* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-34
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS												
ALUMINUM	2.53E-03	2.92E-03		ND	-	-	5.91E-03	6.80E-03	2.90E+00		2.04E-03	2.35E-03
ARSENIC	3.93E-03	4.08E-03	1.75E+00		6.88E-03	7.14E-03	9.17E-03	9.53E-03	3.00E-04		3.06E+01	3.18E+01
CHROMIUM	5.52E-04	7.58E-04		ND	-	-	1.29E-03	1.77E-03	5.00E-03		2.57E-01	3.54E-01
COPPER	5.40E-04	5.66E-04		ND	-	-	1.26E-03	1.32E-03	3.70E-02		3.40E-02	3.57E-02
IRON	6.61E-03	8.79E-03		ND	-	-	1.54E-02	2.05E-02		ND	-	-
LEAD	1.29E-04	2.22E-04		ND	-	-	3.02E-04	5.17E-04		ND	-	-
MANGANESE	9.81E-04	1.81E-03		ND	-	-	2.29E-03	4.22E-03	1.00E-01		2.29E-02	4.22E-02
MERCURY	3.15E-05	5.13E-05		ND	-	-	7.35E-05	1.20E-04	3.00E-04		2.45E-01	3.99E-01
NICKEL	3.23E-04	3.55E-04		ND	-	-	7.54E-04	8.27E-04	2.00E-02		3.77E-02	4.14E-02
ZINC	2.03E-02	2.46E-02		ND	-	-	4.74E-02	5.73E-02	2.00E-01		2.37E-01	2.86E-01
PESTICIDES												
ALDRIN	9.33E-07	1.40E-06	1.70E+01		1.59E-05	2.38E-05	2.18E-06	3.27E-06	3.00E-05		7.26E-02	1.09E-01
ALPHA-CHLORDANE	9.33E-07	1.40E-06	1.30E+00		1.21E-06	1.82E-06	2.18E-06	3.27E-06	6.00E-05		3.63E-02	5.44E-02
HEPTACHLOR	9.33E-07	1.40E-06	4.50E+00		4.20E-06	6.30E-06	2.18E-06	3.27E-06	5.00E-04		4.35E-03	6.53E-03
HEPTACHLOR EPOXIDE	9.33E-07	1.40E-06	9.10E+00		8.49E-06	1.27E-05	2.18E-06	3.27E-06	1.30E-05		1.67E-01	2.51E-01
HEXACHLOROBENZENE	3.73E-06	5.60E-06	1.60E+00		5.97E-06	8.96E-06	8.71E-06	1.31E-05	8.00E-04		1.09E-02	1.63E-02
LINDANE (GAMMA-BHC)	9.33E-07	1.40E-06	1.30E+00		1.21E-06	1.82E-06	2.18E-06	3.27E-06	3.00E-04		7.26E-03	1.09E-02
MIREX	9.33E-07	1.40E-06	1.80E+00		1.68E-06	2.52E-06	2.18E-06	3.27E-06	2.00E-04		1.09E-02	1.63E-02
TRANS-NONACHLOR	1.87E-06	2.57E-06		ND	-	-	4.35E-06	5.99E-06		ND	-	-
o,p'-DDD	9.33E-07	1.40E-06		ND	-	-	2.18E-06	3.27E-06		ND	-	-
o,p'-DDE	9.33E-07	1.40E-06		ND	-	-	2.18E-06	3.27E-06		ND	-	-
o,p'-DDT	9.33E-07	1.40E-06		ND	-	-	2.18E-06	3.27E-06		ND	-	-
p,p'-DDD	9.33E-07	1.40E-06	2.40E-01		2.24E-07	3.36E-07	2.18E-06	3.27E-06		ND	-	-
p,p'-DDE	8.16E-06	1.24E-05	3.40E-01		2.78E-06	4.20E-06	1.91E-05	2.88E-05		ND	-	-
p,p'-DDT	9.33E-07	1.40E-06	3.40E-01		3.17E-07	4.76E-07	2.18E-06	3.27E-06	5.00E-04		4.35E-03	6.53E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	9.99E-05	1.46E-04	7.70E+00		7.69E-04	1.12E-03	2.33E-04	3.40E-04		ND		
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					7.69E-03	8.33E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				3.17E+01	3.34E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-35
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET
CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE GROUP LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ALUMINUM	5.03E-03	6.25E-03		ND	-	-	1.17E-02	1.46E-02	2.90E+00		4.05E-03	5.03E-03
ARSENIC	3.22E-03	3.83E-03	1.75E+00		5.63E-03	6.69E-03	7.51E-03	8.93E-03	3.00E-04		2.50E+01	2.98E+01
CADMIUM	1.38E-05	2.73E-05		ND	-	-	3.22E-05	6.37E-05	1.00E-03		3.22E-02	6.37E-02
CHROMIUM	4.02E-04	6.00E-04		ND	-	-	9.39E-04	1.40E-03	5.00E-03		1.88E-01	2.80E-01
COPPER	6.18E-04	8.19E-04		ND	-	-	1.44E-03	1.91E-03	3.70E-02		3.89E-02	5.16E-02
IRON	1.26E-02	1.50E-02		ND	-	-	2.95E-02	3.50E-02		ND	-	-
LEAD	8.63E-05	1.14E-04		ND	-	-	2.01E-04	2.67E-04		ND	-	-
MANGANESE	6.43E-04	1.36E-03		ND	-	-	1.50E-03	3.18E-03	1.00E-01		1.50E-02	3.18E-02
MERCURY	7.36E-05	8.19E-05		ND	-	-	1.72E-04	1.91E-04	3.00E-04		5.72E-01	6.37E-01
NICKEL	3.68E-04	4.12E-04		ND	-	-	8.59E-04	9.61E-04	2.00E-02		4.29E-02	4.81E-02
SILVER	1.52E-05	3.31E-05		ND	-	-	3.55E-05	7.73E-05	5.00E-03		7.09E-03	1.55E-02
ZINC	1.74E-02	2.24E-02		ND	-	-	4.07E-02	5.23E-02	2.00E-01		2.04E-01	2.62E-01
PESTICIDES												
ALDRIN	2.81E-07	3.50E-07	1.70E+01		4.78E-06	5.95E-06	6.57E-07	8.16E-07	3.00E-05		2.19E-02	2.72E-02
ALPHA-CHLORDANE	8.36E-07	1.99E-06	1.30E+00		1.09E-06	2.58E-06	1.95E-06	4.63E-06	6.00E-05		3.25E-02	7.72E-02
HEPTACHLOR	2.81E-07	3.50E-07	4.50E+00		1.27E-06	1.57E-06	6.57E-07	8.16E-07	5.00E-04		1.31E-03	1.63E-03
HEPTACHLOR EPOXIDE	2.81E-07	3.50E-07	9.10E+00		2.56E-06	3.18E-06	6.57E-07	8.16E-07	1.30E-05		5.05E-02	6.28E-02
HEXACHLOROBENZENE	1.29E-06	2.74E-06	1.60E+00		2.07E-06	4.38E-06	3.02E-06	6.38E-06	8.00E-04		3.77E-03	7.98E-03
LINDANE (GAMMA-BHC)	2.38E-07	3.22E-07	1.30E+00		3.10E-07	4.18E-07	5.56E-07	7.51E-07	3.00E-04		1.85E-03	2.50E-03
MIREX	2.73E-07	3.50E-07	1.80E+00		4.92E-07	6.30E-07	6.38E-07	8.16E-07	2.00E-04		3.19E-03	4.08E-03
TRANS-NONACHLOR	1.68E-06	3.11E-06		ND	-	-	3.93E-06	7.26E-06		ND	-	-
o,p'-DDD	6.93E-07	1.06E-06		ND	-	-	1.62E-06	2.48E-06		ND	-	-
o,p'-DDE	3.60E-07	7.18E-07		ND	-	-	8.41E-07	1.68E-06		ND	-	-
o,p'-DDT	8.68E-07	1.93E-06		ND	-	-	2.03E-06	4.51E-06		ND	-	-
p,p'-DDD	3.20E-06	6.44E-06	2.40E-01		7.68E-07	1.55E-06	7.47E-06	1.50E-05		ND	-	-
p,p'-DDE	9.77E-06	2.20E-05	3.40E-01		3.32E-06	7.48E-06	2.28E-05	5.13E-05		ND	-	-
p,p'-DDT	1.31E-06	1.87E-06	3.40E-01		4.46E-07	6.37E-07	3.06E-06	4.37E-06	5.00E-04		6.12E-03	8.74E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	9.45E-05	1.86E-04	7.70E+00		7.28E-04	1.43E-03	2.21E-04	4.35E-04		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					6.38E-03	8.16E-03	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.63E+01	3.13E+01

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-36
POTENTIAL RISKS CALCULATED FOR CONSUMPTION OF FLOUNDER FILLET CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES OFF-SITE, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
PESTICIDES												
ALPHA-CHLORDANE	9.10E-07	9.10E-07	1.30E+00		1.18E-06 *	1.18E-06	2.12E-06	2.12E-06	6.00E-05		3.54E-02 *	3.54E-02
TRANS-NONACHLOR	4.43E-07	4.43E-07		ND	-	-	1.03E-06	1.03E-06		ND	-	-
p,p'-DDD	8.16E-07	8.16E-07	2.40E-01		1.96E-07 *	1.96E-07	1.91E-06	1.91E-06		ND	-	-
p,p'-DDE	1.84E-06	1.84E-06	3.40E-01		6.27E-07 *	6.27E-07	4.30E-06	4.30E-06		ND	-	-
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	3.15E-05	3.30E-05	7.70E+00		2.43E-04	2.54E-04	7.36E-05	7.70E-05		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					2.45E-04	2.56E-04	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				3.54E-02	3.54E-02

NOTES:

ND : NO DATA AVAILABLE
* : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-37
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
INORGANICS												
ALUMINUM	3.95E-04	9.15E-04		ND	-	-	9.22E-04	2.13E-03	2.90E+00		3.18E-04	7.36E-04
ARSENIC	1.44E-07	3.37E-07	1.75E+00		2.53E-07	5.90E-07	3.37E-07	7.86E-07	3.00E-04		1.12E-03	2.62E-03
CADMIUM	6.80E-09	2.35E-08		ND	-	-	1.59E-08	5.48E-08	1.00E-03		1.59E-05	5.48E-05
CHROMIUM	1.28E-06	2.48E-06		ND	-	-	2.99E-06	5.78E-06	5.00E-03		5.97E-04	1.16E-03
COPPER	5.08E-07	1.23E-06		ND	-	-	1.19E-06	2.88E-06	3.70E-02		3.20E-05	7.77E-05
IRON	2.89E-04	5.91E-04		ND	-	-	6.75E-04	1.38E-03		ND	-	-
LEAD	7.44E-07	1.46E-06		ND	-	-	1.74E-06	3.40E-06		ND	-	-
MANGANESE	3.58E-06	6.36E-06		ND	-	-	8.36E-06	1.48E-05	1.00E-01		8.36E-05	1.48E-04
MERCURY	2.64E-09	7.87E-09		ND	-	-	6.16E-09	1.84E-08	3.00E-04		2.05E-05	6.12E-05
NICKEL	3.28E-07	1.07E-06		ND	-	-	7.65E-07	2.50E-06	2.00E-02		3.82E-05	1.25E-04
SILVER	6.96E-09	1.53E-08		ND	-	-	1.62E-08	3.56E-08	5.00E-03		3.25E-06	7.12E-06
ZINC	1.48E-06	6.22E-06		ND	-	-	3.46E-06	1.45E-05	2.00E-01		1.73E-05	7.26E-05
PESTICIDES												
ALDRIN	1.97E-11	2.63E-10	1.70E+01		3.35E-10	4.47E-09	4.59E-11	6.14E-10	3.00E-05		1.53E-06	2.05E-05
ALPHA-CHLORDANE	8.05E-12	3.43E-11	1.30E+00		1.05E-11	4.46E-11	1.88E-11	8.00E-11	6.00E-05		3.13E-07	1.33E-06
HEXACHLOROBENZENE	7.07E-12	8.45E-11	1.60E+00		1.13E-11	1.35E-10	1.65E-11	1.97E-10	8.00E-04		2.06E-08	2.47E-07
LINDANE (GAMMA-BHC)	4.77E-12	1.25E-11	1.30E+00		6.20E-12	1.62E-11	1.11E-11	2.92E-11	3.00E-04		3.71E-08	9.72E-08
MIREX	5.24E-12	2.00E-11	1.80E+00		9.43E-12	3.59E-11	1.22E-11	4.66E-11	2.00E-04		6.11E-08	2.33E-07
TRANS-NONACHLOR	4.57E-12	1.73E-11		ND	-	-	1.07E-11	4.04E-11		ND	-	-
o,p'-DDD	1.36E-11	4.36E-11		ND	-	-	3.17E-11	1.02E-10		ND	-	-
o,p'-DDE	8.78E-12	2.62E-11		ND	-	-	2.05E-11	6.11E-11		ND	-	-
o,p'-DDT	1.22E-11	1.12E-10		ND	-	-	2.84E-11	2.60E-10		ND	-	-
p,p'-DDD	5.16E-11	2.24E-10	2.40E-01		1.24E-11	5.38E-11	1.20E-10	5.23E-10		ND	-	-
p,p'-DDE	2.72E-11	7.51E-11	3.40E-01		9.24E-12	2.55E-11	6.34E-11	1.75E-10		ND	-	-
p,p'-DDT	1.48E-10	1.40E-09	3.40E-01		5.05E-11	4.77E-10	3.46E-10	3.28E-09	5.00E-04		6.93E-07	6.55E-06

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-37
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	2.83E-09	2.23E-08		ND	-	-	6.61E-09	5.21E-08	3.00E-01		2.20E-08	1.74E-07
BENZO(A)ANTHRACENE	5.65E-09	4.23E-08	5.80E+00		3.28E-08	2.45E-07	1.32E-08	9.86E-08		ND	-	-
BENZO(A)PYRENE	5.66E-09	2.70E-08	5.80E+00		3.28E-08	1.57E-07	1.32E-08	6.30E-08		ND	-	-
BENZO(E)PYRENE	4.11E-09	1.76E-08		ND	-	-	9.60E-09	4.11E-08		ND	-	-
BENZO(G,H,I)PERYLENE	2.29E-09	7.75E-09		ND	-	-	5.34E-09	1.81E-08	4.00E-03		1.33E-06	4.52E-06
CHRYSENE	5.71E-09	3.76E-08	5.80E+00		3.31E-08	2.18E-07	1.33E-08	8.77E-08		ND	-	-
DIBENZO(A,H)ANTHRACENE	6.70E-10	2.82E-09	5.80E+00		3.89E-09	1.63E-08	1.56E-09	6.58E-09		ND	-	-
FLUORANTHENE	1.34E-08	1.64E-07		ND	-	-	3.12E-08	3.84E-07	4.00E-02		7.81E-07	9.59E-06
FLUORENE	8.99E-10	1.29E-08		ND	-	-	2.10E-09	3.01E-08	4.00E-02		5.25E-08	7.53E-07
INDENO(1,2,3-CD)PYRENE	2.53E-09	1.12E-08	5.80E+00		1.47E-08	6.47E-08	5.90E-09	2.60E-08		ND	-	-
PERYLENE	1.83E-09	1.01E-08		ND	-	-	4.28E-09	2.36E-08		ND	-	-
PHENANTHRENE	7.36E-09	7.28E-08		ND	-	-	1.72E-08	1.70E-07	4.00E-03		4.29E-06	4.25E-05
PYRENE	1.15E-08	1.17E-07		ND	-	-	2.68E-08	2.74E-07	3.00E-02		8.93E-07	9.13E-06
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	7.87E-10	4.08E-09	7.70E+00		6.06E-09	3.14E-08	1.84E-09	9.53E-09		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.76E-07	1.33E-06	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.26E-03	5.16E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-38
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
INORGANICS												
ALUMINUM	2.74E-04	3.10E-04		ND	-	-	7.68E-04	8.68E-04	2.90E+00		2.65E-04	2.99E-04
ARSENIC	5.92E-08	1.27E-07	1.75E+00		1.04E-07	2.23E-07	1.66E-07	3.56E-07	3.00E-04		5.53E-04	1.19E-03
CADMIUM	1.96E-09	2.64E-09		ND	-	-	5.48E-09	7.40E-09	1.00E-03		5.48E-06	7.40E-06
CHROMIUM	5.70E-07	9.77E-07		ND	-	-	1.60E-06	2.73E-06	5.00E-03		3.19E-04	5.47E-04
COPPER	7.86E-08	2.19E-07		ND	-	-	2.20E-07	6.14E-07	3.70E-02		5.95E-06	1.66E-05
IRON	1.38E-04	2.23E-04		ND	-	-	3.88E-04	6.25E-04		ND	-	-
LEAD	2.67E-07	6.06E-07		ND	-	-	7.48E-07	1.70E-06		ND	-	-
MANGANESE	2.05E-06	2.99E-06		ND	-	-	5.74E-06	8.38E-06	1.00E-01		5.74E-05	8.38E-05
NICKEL	1.34E-07	2.12E-07		ND	-	-	3.76E-07	5.95E-07	2.00E-02		1.88E-05	2.97E-05
SILVER	4.00E-09	8.71E-09		ND	-	-	1.12E-08	2.44E-08	5.00E-03		2.24E-06	4.88E-06
ZINC	4.84E-07	8.02E-07		ND	-	-	1.36E-06	2.25E-06	2.00E-01		6.78E-06	1.12E-05
PESTICIDES												
ALDRIN	3.44E-12	6.69E-12	1.70E+01		5.86E-11	1.14E-10	9.64E-12	1.87E-11	3.00E-05		3.21E-07	6.25E-07
ALPHA-CHLORDANE	6.04E-12	9.60E-12	1.30E+00		7.85E-12	1.25E-11	1.69E-11	2.69E-11	6.00E-05		2.82E-07	4.48E-07
o,p'-DDD	5.35E-12	8.00E-12		ND	-	-	1.50E-11	2.24E-11		ND	-	-
o,p'-DDE	2.18E-12	3.00E-12		ND	-	-	6.11E-12	8.41E-12		ND	-	-
p,p'-DDD	1.23E-11	3.41E-11	2.40E-01		2.95E-12	8.19E-12	3.44E-11	9.55E-11		ND	-	-
p,p'-DDE	7.20E-12	2.15E-11	3.40E-01		2.45E-12	7.30E-12	2.02E-11	6.01E-11		ND	-	-
p,p'-DDT	6.90E-11	1.15E-10	3.40E-01		2.35E-11	3.92E-11	1.93E-10	3.23E-10	5.00E-04		3.87E-07	6.46E-07

NOTES:
ND - NO DATA AVAILABLE

TABLE 5-38
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	1.90E-09	3.91E-09		ND	-	-	5.32E-09	1.10E-08	3.00E-01		1.77E-08	3.65E-08
BENZO(A)ANTHRACENE	3.47E-09	6.65E-09	5.80E+00		2.01E-08	3.86E-08	9.72E-09	1.86E-08		ND	-	-
BENZO(A)PYRENE	3.68E-09	6.85E-09	5.80E+00		2.13E-08	3.97E-08	1.03E-08	1.92E-08		ND	-	-
BENZO(E)PYRENE	2.37E-09	4.70E-09		ND	-	-	6.64E-09	1.32E-08		ND	-	-
BENZO(G,H,I)PERYLENE	1.41E-09	2.84E-09		ND	-	-	3.96E-09	7.95E-09	4.00E-03		9.90E-07	1.99E-06
CHRYSENE	3.30E-09	6.16E-09	5.80E+00		1.91E-08	3.58E-08	9.23E-09	1.73E-08		ND	-	-
DIBENZO(A,H)ANTHRACENE	5.55E-10	1.17E-09	5.80E+00		3.22E-09	6.81E-09	1.55E-09	3.29E-09		ND	-	-
FLUORANTHENE	6.47E-09	1.17E-08		ND	-	-	1.81E-08	3.29E-08	4.00E-02		4.53E-07	8.22E-07
FLUORENE	3.74E-10	8.02E-10		ND	-	-	1.05E-09	2.25E-09	4.00E-02		2.62E-08	5.62E-08
INDENO(1,2,3-CD)PYRENE	1.81E-09	3.72E-09	5.80E+00		1.05E-08	2.16E-08	5.06E-09	1.04E-08		ND	-	-
PERYLENE	1.01E-09	1.96E-09		ND	-	-	2.82E-09	5.48E-09		ND	-	-
PHENANTHRENE	3.39E-09	6.26E-09		ND	-	-	9.48E-09	1.75E-08	4.00E-03		2.37E-06	4.38E-06
PYRENE	5.91E-09	1.08E-08		ND	-	-	1.66E-08	3.01E-08	3.00E-02		5.52E-07	1.00E-06
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	5.33E-10	1.31E-09	7.70E+00		4.11E-09	1.01E-08	1.49E-09	3.66E-09		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.82E-07	3.75E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.24E-03	2.20E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-39
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM AROUND SEAVEY ISLAND FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS												
ALUMINUM	3.19E-04	4.77E-04		ND	-	-	8.94E-04	1.34E-03	2.90E+00		3.08E-04	4.61E-04
ARSENIC	1.07E-07	1.74E-07	1.75E+00		1.88E-07	3.05E-07	3.01E-07	4.88E-07	3.00E-04		1.00E-03	1.63E-03
CADMIUM	5.22E-09	1.96E-08		ND	-	-	1.46E-08	5.48E-08	1.00E-03		1.46E-05	5.48E-05
CHROMIUM	8.63E-07	1.48E-06		ND	-	-	2.42E-06	4.14E-06	5.00E-03		4.83E-04	8.27E-04
COPPER	4.61E-07	1.03E-06		ND	-	-	1.29E-06	2.88E-06	3.70E-02		3.49E-05	7.77E-05
IRON	2.31E-04	4.92E-04		ND	-	-	6.47E-04	1.38E-03		ND	-	-
LEAD	6.93E-07	1.21E-06		ND	-	-	1.94E-06	3.40E-06		ND	-	-
MANGANESE	3.02E-06	4.12E-06		ND	-	-	8.46E-06	1.15E-05	1.00E-01		8.46E-05	1.15E-04
MERCURY	2.10E-09	6.56E-09		ND	-	-	5.87E-09	1.84E-08	3.00E-04		1.96E-05	6.12E-05
NICKEL	2.74E-07	8.92E-07		ND	-	-	7.69E-07	2.50E-06	2.00E-02		3.84E-05	1.25E-04
SILVER	4.51E-09	7.24E-09		ND	-	-	1.26E-08	2.03E-08	5.00E-03		2.53E-06	4.05E-06
ZINC	1.36E-06	5.19E-06		ND	-	-	3.82E-06	1.45E-05	2.00E-01		1.91E-05	7.26E-05
PESTICIDES												
ALDRIN	2.73E-11	2.19E-10	1.70E+01		4.65E-10	3.73E-09	7.66E-11	6.14E-10	3.00E-05		2.55E-06	2.05E-05
ALPHA-CHLORDANE	6.65E-12	2.86E-11	1.30E+00		8.65E-12	3.72E-11	1.86E-11	8.00E-11	6.00E-05		3.11E-07	1.33E-06
HEXACHLOROBENZENE	3.25E-12	8.43E-12	1.60E+00		5.20E-12	1.35E-11	9.10E-12	2.36E-11	8.00E-04		1.14E-08	2.95E-08
LINDANE (GAMMA-BHC)	4.49E-12	1.04E-11	1.30E+00		5.84E-12	1.35E-11	1.26E-11	2.92E-11	3.00E-04		4.19E-08	9.72E-08
MIREX	3.79E-12	1.17E-11	1.80E+00		6.82E-12	2.11E-11	1.06E-11	3.29E-11	2.00E-04		5.30E-08	1.64E-07
TRANS-NONACHLOR	3.34E-12	1.44E-11		ND	-	-	9.34E-12	4.04E-11		ND	-	-
o,p'-DDD	7.81E-12	3.64E-11		ND	-	-	2.19E-11	1.02E-10		ND	-	-
o,p'-DDE	5.70E-12	2.18E-11		ND	-	-	1.60E-11	6.11E-11		ND	-	-
o,p'-DDT	1.12E-11	9.30E-11		ND	-	-	3.12E-11	2.60E-10		ND	-	-
p,p'-DDD	2.96E-11	1.87E-10	2.40E-01		7.11E-12	4.48E-11	8.29E-11	5.23E-10		ND	-	-
p,p'-DDE	1.82E-11	5.27E-11	3.40E-01		6.17E-12	1.79E-11	5.08E-11	1.48E-10		ND	-	-
p,p'-DDT	1.84E-10	1.17E-09	3.40E-01		6.24E-11	3.98E-10	5.14E-10	3.28E-09	5.00E-04		1.03E-06	6.55E-06

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-39
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM AROUND SEAVEY ISLAND FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	3.14E-09	1.86E-08		ND	-	-	8.78E-09	5.21E-08	3.00E-01		2.93E-08	1.74E-07
BENZO(A)ANTHRACENE	5.98E-09	3.52E-08	5.80E+00		3.47E-08	2.04E-07	1.67E-08	9.86E-08		ND	-	-
BENZO(A)PYRENE	5.49E-09	2.15E-08	5.80E+00		3.19E-08	1.25E-07	1.54E-08	6.03E-08		ND	-	-
BENZO(E)PYRENE	3.99E-09	1.47E-08		ND	-	-	1.12E-08	4.11E-08		ND	-	-
BENZO(G,H,I)PERYLENE	2.05E-09	5.38E-09		ND	-	-	5.75E-09	1.51E-08	4.00E-03		1.44E-06	3.77E-06
CHRYSENE	5.96E-09	3.13E-08	5.80E+00		3.45E-08	1.82E-07	1.67E-08	8.77E-08		ND	-	-
DIBENZO(A,H)ANTHRACENE	6.14E-10	2.35E-09	5.80E+00		3.56E-09	1.36E-08	1.72E-09	6.58E-09		ND	-	-
FLUORANTHENE	1.55E-08	1.37E-07		ND	-	-	4.35E-08	3.84E-07	4.00E-02		1.09E-06	9.59E-06
FLUORENE	9.25E-10	6.60E-09		ND	-	-	2.59E-09	1.85E-08	4.00E-02		6.47E-08	4.62E-07
INDENO(1,2,3-CD)PYRENE	2.22E-09	6.75E-09	5.80E+00		1.29E-08	3.92E-08	6.22E-09	1.89E-08		ND	-	-
PERYLENE	1.81E-09	8.41E-09		ND	-	-	5.06E-09	2.36E-08		ND	-	-
PHENANTHRENE	8.27E-09	6.07E-08		ND	-	-	2.31E-08	1.70E-07	4.00E-03		5.79E-06	4.25E-05
PYRENE	1.28E-08	9.78E-08		ND	-	-	3.59E-08	2.74E-07	3.00E-02		1.20E-06	9.13E-06
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	5.84E-10	3.40E-09	7.70E+00		4.49E-09	2.62E-08	1.63E-09	9.53E-09		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.10E-07	8.99E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.02E-03	3.52E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-40
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
INORGANICS												
ALUMINUM	3.67E-04	7.62E-04		ND	-	-	1.03E-03	2.13E-03	2.90E+00		3.54E-04	7.36E-04
ARSENIC	1.55E-07	2.81E-07	1.75E+00		2.72E-07	4.91E-07	4.35E-07	7.86E-07	3.00E-04		1.45E-03	2.62E-03
CADMIUM	7.37E-09	1.08E-08		ND	-	-	2.06E-08	3.01E-08	1.00E-03		2.06E-05	3.01E-05
CHROMIUM	1.47E-06	2.06E-06		ND	-	-	4.11E-06	5.78E-06	5.00E-03		8.22E-04	1.16E-03
COPPER	4.84E-07	9.04E-07		ND	-	-	1.36E-06	2.53E-06	3.70E-02		3.66E-05	6.84E-05
IRON	2.87E-04	3.91E-04		ND	-	-	8.03E-04	1.10E-03		ND	-	-
LEAD	6.43E-07	1.02E-06		ND	-	-	1.80E-06	2.85E-06		ND	-	-
MANGANESE	3.23E-06	5.30E-06		ND	-	-	9.05E-06	1.48E-05	1.00E-01		9.05E-05	1.48E-04
MERCURY	2.50E-09	6.56E-09		ND	-	-	6.99E-09	1.84E-08	3.00E-04		2.33E-05	6.12E-05
NICKEL	3.15E-07	4.35E-07		ND	-	-	8.83E-07	1.22E-06	2.00E-02		4.41E-05	6.10E-05
SILVER	7.81E-09	1.27E-08		ND	-	-	2.19E-08	3.56E-08	5.00E-03		4.37E-06	7.12E-06
ZINC	1.33E-06	2.02E-06		ND	-	-	3.71E-06	5.64E-06	2.00E-01		1.86E-05	2.82E-05
PESTICIDES												
ALDRIN	6.14E-12	1.76E-11	1.70E+01		1.04E-10	2.99E-10	1.72E-11	4.93E-11	3.00E-05		5.73E-07	1.64E-06
ALPHA-CHLORDANE	7.02E-12	2.32E-11	1.30E+00		9.12E-12	3.01E-11	1.96E-11	6.48E-11	6.00E-05		3.27E-07	1.08E-06
HEPTACLOR EPOXIDE	3.39E-12	8.81E-12	9.10E+00		3.08E-11	8.01E-11	9.48E-12	2.47E-11	1.30E-05		7.29E-07	1.90E-06
HEXACHLOROBENZENE	1.10E-11	7.05E-11	1.60E+00		1.76E-11	1.13E-10	3.08E-11	1.97E-10	8.00E-04		3.85E-08	2.47E-07
LINDANE (GAMMA-BHC)	3.75E-12	7.71E-12	1.30E+00		4.87E-12	1.00E-11	1.05E-11	2.16E-11	3.00E-04		3.50E-08	7.20E-08
MIREX	5.61E-12	1.66E-11	1.80E+00		1.01E-11	2.99E-11	1.57E-11	4.66E-11	2.00E-04		7.85E-08	2.33E-07
TRANS-NONACHLOR	5.12E-12	1.21E-11		ND	-	-	1.43E-11	3.38E-11		ND	-	-
o,p'-DDD	1.80E-11	2.84E-11		ND	-	-	5.04E-11	7.95E-11		ND	-	-
o,p'-DDE	1.12E-11	2.15E-11		ND	-	-	3.13E-11	6.03E-11		ND	-	-
o,p'-DDT	1.14E-11	4.11E-11		ND	-	-	3.19E-11	1.15E-10		ND	-	-
p,p'-DDD	7.10E-11	1.57E-10	2.40E-01		1.71E-11	3.76E-11	1.99E-10	4.38E-10		ND	-	-
p,p'-DDE	3.38E-11	6.26E-11	3.40E-01		1.15E-11	2.13E-11	9.46E-11	1.75E-10		ND	-	-
p,p'-DDT	5.05E-11	1.38E-10	3.40E-01		1.72E-11	4.69E-11	1.42E-10	3.87E-10	5.00E-04		2.83E-07	7.73E-07

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-40
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	9.43E-10	1.86E-09		ND	-	-	2.64E-09	5.21E-09	3.00E-01		8.80E-09	1.74E-08
BENZO(A)ANTHRACENE	2.75E-09	4.40E-09	5.80E+00		1.59E-08	2.55E-08	7.70E-09	1.23E-08		ND	-	-
BENZO(A)PYRENE	3.24E-09	5.58E-09	5.80E+00		1.88E-08	3.23E-08	9.08E-09	1.56E-08		ND	-	-
BENZO(E)PYRENE	2.51E-09	4.11E-09		ND	-	-	7.03E-09	1.15E-08		ND	-	-
BENZO(G,H,I)PERYLENE	1.68E-09	3.72E-09		ND	-	-	4.70E-09	1.04E-08	4.00E-03		1.18E-06	2.60E-06
CHRYSENE	2.95E-09	5.09E-09	5.80E+00		1.71E-08	2.95E-08	8.27E-09	1.42E-08		ND	-	-
DIBENZO(A,H)ANTHRACENE	4.16E-10	8.22E-10	5.80E+00		2.41E-09	4.77E-09	1.17E-09	2.30E-09		ND	-	-
FLUORANTHENE	5.68E-09	9.78E-09		ND	-	-	1.59E-08	2.74E-08	4.00E-02		3.98E-07	6.85E-07
FLUORENE	3.09E-10	6.75E-10		ND	-	-	8.65E-10	1.89E-09	4.00E-02		2.16E-08	4.73E-08
INDENO(1,2,3-CD)PYRENE	1.73E-09	3.33E-09	5.80E+00		1.00E-08	1.93E-08	4.83E-09	9.32E-09		ND	-	-
PERYLENE	1.13E-09	1.66E-09		ND	-	-	3.17E-09	4.66E-09		ND	-	-
PHENANTHRENE	2.91E-09	5.19E-09		ND	-	-	8.14E-09	1.45E-08	4.00E-03		2.03E-06	3.63E-06
PYRENE	5.48E-09	9.20E-09		ND	-	-	1.54E-08	2.58E-08	3.00E-02		5.12E-07	8.58E-07
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	7.99E-10	1.86E-09	7.70E+00		6.15E-09	1.43E-08	2.24E-09	5.22E-09		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.42E-07	6.18E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.87E-03	4.93E-03

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-41
POTENTIAL RISKS CALCULATED FOR INGESTION OF SEDIMENT FROM YORK HARBOR SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)			CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	RfD (mg/kg/day)	AVG	MAX
INORGANICS										
ALUMINUM	1.83E-04	2.03E-04	ND	-	-	5.12E-04	5.67E-04	2.90E+00	1.77E-04	1.96E-04
ARSENIC	7.19E-09	1.17E-08	1.75E+00	1.26E-08	2.05E-08	2.01E-08	3.29E-08	3.00E-04	6.71E-05	1.10E-04
CHROMIUM	2.73E-07	3.33E-07	ND	-	-	7.63E-07	9.32E-07	5.00E-03	1.53E-04	1.86E-04
COPPER	1.27E-08	1.57E-08	ND	-	-	3.55E-08	4.38E-08	3.70E-02	9.59E-07	1.18E-06
IRON	7.19E-05	9.05E-05	ND	-	-	2.01E-04	2.53E-04	ND	-	-
LEAD	1.95E-07	2.47E-07	ND	-	-	5.45E-07	6.90E-07	ND	-	-
MANGANESE	1.02E-06	1.32E-06	ND	-	-	2.86E-06	3.70E-06	1.00E-01	2.86E-05	3.70E-05
NICKEL	9.10E-08	1.09E-07	ND	-	-	2.55E-07	3.04E-07	2.00E-02	1.27E-05	1.52E-05
ZINC	1.91E-07	2.12E-07	ND	-	-	5.34E-07	5.95E-07	2.00E-01	2.67E-06	2.97E-06
PESTICIDES										
ALDRIN	6.66E-12	7.05E-12	1.70E+01	1.13E-10	1.20E-10	1.87E-11	1.98E-11	3.00E-05	6.22E-07	6.58E-07
p,p'-DDT	5.85E-11	6.76E-11	3.40E-01	1.99E-11	2.30E-11	1.64E-10	1.89E-10	5.00E-04	3.28E-07	3.79E-07
POLYAROMATIC HYDROCARBONS										
ANTHRACENE	1.47E-10	1.66E-10	ND	-	-	4.11E-10	4.66E-10	3.00E-01	1.37E-09	1.55E-09
BENZO(A)ANTHRACENE	4.35E-10	6.36E-10	5.80E+00	2.53E-09	3.69E-09	1.22E-09	1.78E-09	ND	-	-
BENZO(A)PYRENE	5.43E-10	8.22E-10	5.80E+00	3.15E-09	4.77E-09	1.52E-09	2.30E-09	ND	-	-
BENZO(E)PYRENE	3.82E-10	5.87E-10	ND	-	-	1.07E-09	1.64E-09	ND	-	-
BENZO(G,H,I)PERYLENE	2.40E-10	4.40E-10	ND	-	-	6.71E-10	1.23E-09	4.00E-03	1.68E-07	3.08E-07
CHRYSENE	4.94E-10	7.44E-10	5.80E+00	2.87E-09	4.31E-09	1.38E-09	2.08E-09	ND	-	-
FLUORANTHENE	1.10E-09	1.47E-09	ND	-	-	3.07E-09	4.11E-09	4.00E-02	7.67E-08	1.03E-07
FLUORENE	5.38E-11	5.87E-11	ND	-	-	1.51E-10	1.64E-10	4.00E-02	3.77E-09	4.11E-09
INDENO(1,2,3-CD)PYRENE	3.08E-10	5.58E-10	5.80E+00	1.79E-09	3.23E-09	8.63E-10	1.56E-09	ND	-	-
PERYLENE	1.37E-10	2.35E-10	ND	-	-	3.84E-10	6.58E-10	ND	-	-
PHENANTHRENE	6.31E-10	7.24E-10	ND	-	-	1.77E-09	2.03E-09	4.00E-03	4.42E-07	5.07E-07
PYRENE	9.25E-10	1.27E-09	ND	-	-	2.59E-09	3.56E-09	3.00E-02	8.63E-08	1.19E-07
POLYCHLORINATED BIPHENYLS (PCBs)										
TOTAL PCBs (AROCHLOR)	7.93E-11	1.01E-10	7.70E+00	6.10E-10	7.76E-10	2.22E-10	2.82E-10	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				2.37E-08	3.75E-08	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			4.43E-04	5.50E-04

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-42
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT WITH SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING IN RIVER, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
INORGANICS												
CADMIUM	6.67E-10	2.30E-09		ND	-	-	1.56E-09	5.37E-09	5.00E-04		3.11E-06	1.07E-05
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	4.60E-10	2.40E-09	7.70E+00		3.54E-09	1.85E-08	1.08E-09	5.60E-09		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.54E-09	1.85E-08	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				3.11E-06	1.07E-05

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-43
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT WITH SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATONS
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING IN RIVER, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
PESTICIDES												
ALDRIN	1.69E-12	3.28E-12	1.70E+01		2.87E-11	5.58E-11	4.73E-12	9.18E-12	3.00E-05		1.58E-07	3.06E-07
ALPHA-CHLORDANE	2.96E-12	4.70E-12	1.30E+00		3.85E-12	6.11E-12	8.28E-12	1.32E-11	6.00E-05		1.38E-07	2.19E-07
o,p'-DDD	2.62E-12	3.92E-12		ND	-	-	7.34E-12	1.10E-11		ND	-	-
o,p'-DDE	1.07E-12	1.47E-12		ND	-	-	2.99E-12	4.12E-12		ND	-	-
p,p'-DDD	6.02E-12	1.67E-11	2.40E-01		1.44E-12	4.01E-12	1.68E-11	4.68E-11		ND	-	-
p,p'-DDE	3.53E-12	1.05E-11	3.40E-01		1.20E-12	3.57E-12	9.88E-12	2.94E-11		ND	-	-
p,p'-DDT	3.38E-11	5.65E-11	3.40E-01		1.15E-11	1.92E-11	9.47E-11	1.58E-10	5.00E-04		1.89E-07	3.16E-07
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	9.31E-09	1.92E-08		ND	-	-	2.61E-08	5.37E-08	3.00E-01		8.69E-08	1.79E-07
BENZO(A)ANTHRACENE	1.70E-08	3.26E-08	5.80E+00		9.86E-08	1.89E-07	4.76E-08	9.13E-08		ND	-	-
BENZO(A)PYRENE	1.80E-08	3.36E-08	5.80E+00		1.05E-07	1.95E-07	5.05E-08	9.40E-08		ND	-	-
BENZO(E)PYRENE	1.16E-08	2.30E-08		ND	-	-	3.25E-08	6.44E-08		ND	-	-
BENZO(G,H,I)PERYLENE	6.93E-09	1.39E-08		ND	-	-	1.94E-08	3.89E-08	4.00E-03		4.85E-06	9.73E-06
CHRYSENE	1.62E-08	3.02E-08	5.80E+00		9.37E-08	1.75E-07	4.52E-08	8.46E-08		ND	-	-
DIBENZO(A,H)ANTHRACENE	2.72E-09	5.75E-09	5.80E+00		1.58E-08	3.34E-08	7.61E-09	1.61E-08		ND	-	-
FLUORANTHENE	3.17E-08	5.75E-08		ND	-	-	8.88E-08	1.61E-07	4.00E-02		2.22E-06	4.03E-06
FLUORENE	1.83E-09	3.93E-09		ND	-	-	5.13E-09	1.10E-08	4.00E-02		1.28E-07	2.75E-07
INDENO(1,2,3-CD)PYRENE	8.85E-09	1.82E-08	5.80E+00		5.13E-08	1.06E-07	2.48E-08	5.10E-08		ND	-	-
PERYLENE	4.93E-09	9.59E-09		ND	-	-	1.38E-08	2.68E-08		ND	-	-
PHENANTHRENE	1.66E-08	3.07E-08		ND	-	-	4.65E-08	8.59E-08	4.00E-03		1.16E-05	2.15E-05
PYRENE	2.90E-08	5.27E-08		ND	-	-	8.11E-08	1.48E-07	3.00E-02		2.70E-06	4.92E-06
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	2.61E-09	6.41E-09	7.70E+00		2.01E-08	4.93E-08	7.32E-09	1.79E-08		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.84E-07	7.47E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.21E-05	4.15E-05

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-44
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT WITH SEDIMENT FROM AROUND SEAVEY ISLAND FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
PESTICIDES												
ALDRIN	1.34E-11	1.07E-10	1.70E+01		2.28E-10	1.83E-09	3.75E-11	3.01E-10	3.00E-05		1.25E-06	1.00E-05
ALPHA-CHLORDANE	3.26E-12	1.40E-11	1.30E+00		4.24E-12	1.82E-11	9.13E-12	3.92E-11	6.00E-05		1.52E-07	6.54E-07
HEXACHLOROBENZENE	1.59E-12	4.13E-12	1.60E+00		2.55E-12	6.61E-12	4.46E-12	1.16E-11	8.00E-04		5.57E-09	1.45E-08
LINDANE (GAMMA-BHC)	2.20E-12	5.10E-12	1.30E+00		2.86E-12	6.63E-12	6.16E-12	1.43E-11	3.00E-04		2.05E-08	4.76E-08
MIREX	1.86E-12	5.75E-12	1.80E+00		3.34E-12	1.04E-11	5.20E-12	1.61E-11	2.00E-04		2.60E-08	8.05E-08
TRANS-NONACHLOR	1.63E-12	7.08E-12		ND	-	-	4.58E-12	1.98E-11		ND	-	-
o,p'-DDD	3.83E-12	1.78E-11		ND	-	-	1.07E-11	4.99E-11		ND	-	-
o,p'-DDE	2.80E-12	1.07E-11		ND	-	-	7.83E-12	2.99E-11		ND	-	-
o,p'-DDT	5.47E-12	4.55E-11		ND	-	-	1.53E-11	1.28E-10		ND	-	-
p,p'-DDD	1.45E-11	9.15E-11	2.40E-01		3.48E-12	2.20E-11	4.06E-11	2.56E-10		ND	-	-
p,p'-DDE	8.90E-12	2.58E-11	3.40E-01		3.03E-12	8.79E-12	2.49E-11	7.24E-11		ND	-	-
p,p'-DDT	9.00E-11	5.73E-10	3.40E-01		3.06E-11	1.95E-10	2.52E-10	1.61E-09	5.00E-04		5.04E-07	3.21E-06
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	1.54E-08	9.11E-08		ND	-	-	4.30E-08	2.55E-07	3.00E-01		1.43E-07	8.50E-07
BENZO(A)ANTHRACENE	2.93E-08	1.73E-07	5.80E+00		1.70E-07	1.00E-06	8.20E-08	4.83E-07		ND	-	-
BENZO(A)PYRENE	2.69E-08	1.05E-07	5.80E+00		1.56E-07	6.12E-07	7.53E-08	2.95E-07		ND	-	-
BENZO(E)PYRENE	1.95E-08	7.19E-08		ND	-	-	5.47E-08	2.01E-07		ND	-	-
BENZO(G,H,I)PERYLENE	1.01E-08	2.64E-08		ND	-	-	2.82E-08	7.38E-08	4.00E-03		7.05E-06	1.85E-05
CHRYSENE	2.92E-08	1.53E-07	5.80E+00		1.69E-07	8.90E-07	8.17E-08	4.30E-07		ND	-	-
DIBENZO(A,H)ANTHRACENE	3.01E-09	1.15E-08	5.80E+00		1.74E-08	6.67E-08	8.42E-09	3.22E-08		ND	-	-
FLUORANTHENE	7.61E-08	6.71E-07		ND	-	-	2.13E-07	1.88E-06	4.00E-02		5.33E-06	4.70E-05
FLUORENE	4.53E-09	3.24E-08		ND	-	-	1.27E-08	9.06E-08	4.00E-02		3.17E-07	2.27E-06
INDENO(1,2,3-CD)PYRENE	1.09E-08	3.31E-08	5.80E+00		6.31E-08	1.92E-07	3.05E-08	9.26E-08		ND	-	-
PERYLENE	8.85E-09	4.12E-08		ND	-	-	2.48E-08	1.15E-07		ND	-	-
PHENANTHRENE	4.05E-08	2.97E-07		ND	-	-	1.13E-07	8.32E-07	4.00E-03		2.84E-05	2.08E-04
PYRENE	6.28E-08	4.79E-07		ND	-	-	1.76E-07	1.34E-06	3.00E-02		5.86E-06	4.47E-05
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	2.86E-09	1.67E-08	7.70E+00		2.20E-08	1.28E-07	8.01E-09	4.67E-08		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.98E-07	2.89E-06	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				4.90E-05	3.35E-04

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-45
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT WITH SEDIMENT FROM CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
PESTICIDES												
ALDRIN	3.01E-12	8.63E-12	1.70E+01		5.11E-11	1.47E-10	8.42E-12	2.42E-11	3.00E-05		2.81E-07	8.05E-07
ALPHA-CHLORDANE	3.44E-12	1.13E-11	1.30E+00		4.47E-12	1.48E-11	9.63E-12	3.18E-11	6.00E-05		1.60E-07	5.30E-07
HEPTACLOR EPOXIDE	1.66E-12	4.32E-12	9.10E+00		1.51E-11	3.93E-11	4.64E-12	1.21E-11	1.30E-05		3.57E-07	9.29E-07
HEXACHLOROBENZENE	5.39E-12	3.45E-11	1.60E+00		8.62E-12	5.52E-11	1.51E-11	9.67E-11	8.00E-04		1.89E-08	1.21E-07
LINDANE (GAMMA-BHC)	1.84E-12	3.78E-12	1.30E+00		2.39E-12	4.91E-12	5.14E-12	1.06E-11	3.00E-04		1.71E-08	3.53E-08
MIREX	2.75E-12	8.15E-12	1.80E+00		4.95E-12	1.47E-11	7.69E-12	2.28E-11	2.00E-04		3.85E-08	1.14E-07
TRANS-NONACHLOR	2.51E-12	5.91E-12		ND	-	-	7.02E-12	1.66E-11		ND	-	-
o,p'-DDD	8.83E-12	1.39E-11		ND	-	-	2.47E-11	3.89E-11		ND	-	-
o,p'-DDE	5.48E-12	1.05E-11		ND	-	-	1.54E-11	2.95E-11		ND	-	-
o,p'-DDT	5.59E-12	2.01E-11		ND	-	-	1.56E-11	5.64E-11		ND	-	-
p,p'-DDD	3.48E-11	7.67E-11	2.40E-01		8.36E-12	1.84E-11	9.75E-11	2.15E-10		ND	-	-
p,p'-DDE	1.66E-11	3.07E-11	3.40E-01		5.63E-12	1.04E-11	4.64E-11	8.59E-11		ND	-	-
p,p'-DDT	2.48E-11	6.77E-11	3.40E-01		8.42E-12	2.30E-11	6.93E-11	1.89E-10	5.00E-04		1.39E-07	3.79E-07
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	4.62E-09	9.11E-09		ND	-	-	1.29E-08	2.55E-08	3.00E-01		4.31E-08	8.50E-08
BENZO(A)ANTHRACENE	1.35E-08	2.16E-08	5.80E+00		7.81E-08	1.25E-07	3.77E-08	6.04E-08		ND	-	-
BENZO(A)PYRENE	1.59E-08	2.73E-08	5.80E+00		9.21E-08	1.59E-07	4.45E-08	7.65E-08		ND	-	-
BENZO(E)PYRENE	1.23E-08	2.01E-08		ND	-	-	3.45E-08	5.64E-08		ND	-	-
BENZO(G,H,I)PERYLENE	8.23E-09	1.82E-08		ND	-	-	2.30E-08	5.10E-08	4.00E-03		5.76E-06	1.28E-05
CHRYSENE	1.45E-08	2.49E-08	5.80E+00		8.40E-08	1.45E-07	4.05E-08	6.98E-08		ND	-	-
DIBENZO(A,H)ANTHRACENE	2.04E-09	4.03E-09	5.80E+00		1.18E-08	2.34E-08	5.71E-09	1.13E-08		ND	-	-
FLUORANTHENE	2.78E-08	4.79E-08		ND	-	-	7.80E-08	1.34E-07	4.00E-02		1.95E-06	3.36E-06
FLUORENE	1.51E-09	3.31E-09		ND	-	-	4.24E-09	9.26E-09	4.00E-02		1.06E-07	2.32E-07
INDENO(1,2,3-CD)PYRENE	8.45E-09	1.63E-08	5.80E+00		4.90E-08	9.45E-08	2.37E-08	4.56E-08		ND	-	-
PERYLENE	5.54E-09	8.15E-09		ND	-	-	1.55E-08	2.28E-08		ND	-	-
PHENANTHRENE	1.42E-08	2.54E-08		ND	-	-	3.99E-08	7.12E-08	4.00E-03		9.97E-06	1.78E-05
PYRENE	2.69E-08	4.51E-08		ND	-	-	7.52E-08	1.26E-07	3.00E-02		2.51E-06	4.21E-06
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	3.91E-09	9.13E-09	7.70E+00		3.01E-08	7.03E-08	1.10E-08	2.56E-08		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					3.45E-07	6.17E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				2.13E-05	4.13E-05

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-46
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT WITH SEDIMENT FROM YORK HARBOR SAMPLE LOCATIONS FOR CURRENT CONDITIONS
RECREATIONAL EXPOSURES, WHILE SWIMMING, FISHING AND WADING, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX			AVG	MAX	AVG	MAX			AVG	MAX
PESTICIDES												
ALDRIN	3.27E-12	3.46E-12	1.70E+01		5.55E-11	5.88E-11	9.14E-12	9.68E-12	3.00E-05		3.05E-07	3.23E-07
p,p'-DDT	2.87E-11	3.31E-11	3.40E-01		9.75E-12	1.13E-11	8.03E-11	9.28E-11	5.00E-04		1.61E-07	1.86E-07
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	7.19E-10	8.15E-10		ND	-	-	2.01E-09	2.28E-09	3.00E-01		6.71E-09	7.61E-09
BENZO(A)ANTHRACENE	2.13E-09	3.12E-09	5.80E+00		1.24E-08	1.81E-08	5.97E-09	8.73E-09		ND	-	-
BENZO(A)PYRENE	2.66E-09	4.03E-09	5.80E+00		1.54E-08	2.34E-08	7.45E-09	1.13E-08		ND	-	-
BENZO(E)PYRENE	1.87E-09	2.88E-09		ND	-	-	5.24E-09	8.05E-09		ND	-	-
BENZO(G,H,I)PERYLENE	1.17E-09	2.16E-09		ND	-	-	3.29E-09	6.04E-09	4.00E-03		8.22E-07	1.51E-06
CHRYSENE	2.42E-09	3.64E-09	5.80E+00		1.40E-08	2.11E-08	6.78E-09	1.02E-08		ND	-	-
FLUORANTHENE	5.37E-09	7.19E-09		ND	-	-	1.50E-08	2.01E-08	4.00E-02		3.76E-07	5.03E-07
FLUORENE	2.64E-10	2.88E-10		ND	-	-	7.38E-10	8.05E-10	4.00E-02		1.85E-08	2.01E-08
INDENO(1,2,3-CD)PYRENE	1.51E-09	2.73E-09	5.80E+00		8.76E-09	1.59E-08	4.23E-09	7.65E-09		ND	-	-
PERYLENE	6.71E-10	1.15E-09		ND	-	-	1.88E-09	3.22E-09		ND	-	-
PHENANTHRENE	3.09E-09	3.55E-09		ND	-	-	8.66E-09	9.93E-09	4.00E-03		2.16E-06	2.48E-06
PYRENE	4.53E-09	6.23E-09		ND	-	-	1.27E-08	1.75E-08	3.00E-02		4.23E-07	5.82E-07
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	3.88E-10	4.94E-10	7.70E+00		2.99E-09	3.80E-09	1.09E-09	1.38E-09		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.37E-08	8.23E-08	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				4.28E-06	5.61E-06

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-47
POTENTIAL RISKS CALCULATED FOR INGESTION OF SURFACE WATER FOR SAMPLES COLLECTED FROM THE LOWER PISCATAQUA
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1	CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)	CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS										
ALUMINUM	5.33E-07	2.49E-06	ND	-	-	1.24E-06	5.81E-06	2.90E+00	4.29E-07	2.00E-06
IRON	6.80E-07	3.36E-06	ND	-	-	1.59E-06	7.84E-06	ND	-	-
LEAD	9.65E-09	5.19E-08	ND	-	-	2.25E-08	1.21E-07	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				-	-	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			4.29E-07	2.00E-06

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-48
POTENTIAL RISKS CALCULATED FOR INGESTION OF SURFACE WATER
FOR SAMPLES COLLECTED FROM THE LOWER PISCATAQUA EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
INORGANICS										
ALUMINUM	6.84E-07	2.07E-06	ND	-	-	1.92E-06	5.81E-06	2.90E+00	6.60E-07	2.00E-06
IRON	6.88E-07	2.80E-06	ND	-	-	1.93E-06	7.84E-06	ND	-	-
LEAD	7.75E-09	1.91E-08	ND	-	-	2.17E-08	5.34E-08	ND	-	-
NICKEL	1.07E-07	5.85E-07	ND	-	-	3.00E-07	1.64E-06	2.00E-02	1.50E-05	8.19E-05
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				-	-	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			1.56E-05	8.39E-05

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-49
POTENTIAL RISKS CALCULATED FOR INGESTION OF SURFACE WATER FOR SAMPLES COLLECTED AROUND SEAVEY ISLAND
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
INORGANICS										
ALUMINUM	3.79E-07	1.32E-06	ND	-	-	1.06E-06	3.69E-06	2.90E+00	3.66E-07	1.27E-06
IRON	5.58E-07	1.37E-06	ND	-	-	1.56E-06	3.85E-06	ND	-	-
LEAD	1.00E-08	4.32E-08	ND	-	-	2.80E-08	1.21E-07	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				-	-	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			3.66E-07	1.27E-06

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-50
POTENTIAL RISKS CALCULATED FOR INGESTION OF SURFACE WATER FOR SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR	CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD	CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1	AVG	MAX	AVG	MAX	(mg/kg/day)	AVG	MAX
INORGANICS										
ALUMINUM	3.26E-07	1.04E-06	ND	-	-	9.12E-07	2.92E-06	2.90E+00	3.14E-07	1.01E-06
IRON	4.79E-07	1.39E-06	ND	-	-	1.34E-06	3.88E-06	ND	-	-
				AVG	MAX				AVG	MAX
CUMULATIVE CARCINOGENIC RISK:				-	-	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:			3.14E-07	1.01E-06

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-51
POTENTIAL RISKS CALCULATED FOR INGESTION OF SURFACE WATER FOR SAMPLES COLLECTED FROM YORK HARBOR
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

ANALYTE	CARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	ORAL SLOPE FACTOR (mg/kg/day)-1		CHEMICAL SPECIFIC RISK AVG	CHEMICAL SPECIFIC RISK MAX	NONCARCINOGENIC RISKS: CHRONIC DAILY INTAKE (mg/kg/day) AVG	CHRONIC DAILY INTAKE (mg/kg/day) MAX	RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT AVG	CHEMICAL SPECIFIC HAZARD QUOTIENT MAX
INORGANICS												
ALUMINUM	1.12E-06	2.39E-06		ND	-	-	3.14E-06	6.70E-06	2.90E+00		1.08E-06	2.31E-06
IRON	1.35E-06	3.79E-06		ND	-	-	3.78E-06	1.06E-05		ND	-	-
LEAD	8.01E-09	2.29E-08		ND	-	-	2.24E-08	6.41E-08		ND	-	-
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					-	-	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.08E-06	2.31E-06

NOTES:

ND - NO DATA AVAILABLE

TABLE 5-52

PREDICTED CHILDREN'S BLOOD LEAD RESULTING FROM INGESTION OF LOBSTER, MUSSELS AND FLOUNDER IN THE LOWER PISCATAQUA FOR AVERAGE AND WORST CASE INGESTION RATES

Species	Lead Concentrations mg/kg	Seafood Ingestion Rate % of Total Meat	Exposure Scenario (Defined by Model)	Predicted Children's Geometric Mean Blood Lead Levels μg/dL(1)	Intercept(2) %
Lobsters, Flounder	0.04	10.0 50.0	Average Worst Case	3.6 3.8	1.39 1.76
Mussels	1.03	10.0 50.0	Average Worst Case	4.9 9.6	6.03 45.07
Weighted Average(3)	0.24	10.0 50.0	Average Worst Case	3.9 5.1	1.99 6.84
GSD = 1.6 Cutoff = 10 μg/dL					

(1) Predicted from USEPA Integrated Exposure Uptake Biokinetic Model Version 99d.
(2) Represent % of population predicted to have blood lead concentrations above 10 μg/dL.
(3) Weighted average of lobster tail + whole lobster + flounder + mussels, with equal weighting applied for each.

TABLE 5-53
SUMMARY OF TOTAL POLYAROMATIC HYDROCARBONS FOR LOWER PISCATAQUA SAMPLE LOCATIONS
OFF-SHORE HUMAN HEALTH RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-1 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR RECREATIONAL FISHING				
TOTAL PAHs	2.73E-04	1.16E-03	2.18E-02	1.02E-01
TABLE 5-6 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
TOTAL PAHs	6.67E-04	2.82E-03	5.34E-02	2.50E-01
TABLE 5-11 CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE) CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR RECREATIONAL FISHING				
TOTAL PAHs	3.06E-04	1.18E-03	3.53E-02	1.01E-01
TABLE 5-13 CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE) CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
TOTAL PAHs	7.47E-04	2.89E-03	8.64E-02	2.46E-01
TABLE 5-21 CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR RECREATIONAL FISHING				
TOTAL PAHs	1.40E-05	3.94E-05	1.07E-03	3.55E-03
TABLE 5-21 CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
TOTAL PAHs	3.42E-05	9.64E-05	2.62E-03	8.67E-03
TABLE 5-37 INGESTION OF SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR CURRENT CONDITIONS				
TOTAL PAHs	1.17E-07	7.01E-07	7.37E-06	6.66E-05

TABLE 5-54
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
FOR SAMPLES COLLECTED FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENS		NONCARCINOGENS	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-1 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	1.50E-03	2.92E-03	6.66E+00	1.30E+01
ALDRIN	-	1.92E-06	-	-
HEPTACHLOR EPOXIDE	-	1.42E-06	-	-
BENZO(A)ANTHRACENE	6.69E-05	2.87E-04	-	-
BENZO(A)PYRENE	7.16E-05	2.92E-04	-	-
CHRYSENE	1.15E-04	5.12E-04	-	-
INDENO(1,2,3-CD)PYRENE	1.93E-05	6.38E-05	-	-
TOTAL PCBs (AROCHLOR)	3.27E-05	5.91E-05	-	-
TABLE 5-6 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	3.66E-03	7.13E-03	1.63E+01	3.17E+01
MERCURY	-	-	1.64E+00	2.10E+00
ALDRIN	2.24E-06	6.19E-06	-	-
HEPTACHLOR EPOXIDE	1.22E-06	3.38E-06	-	-
BENZO(A)ANTHRACENE	1.63E-04	7.03E-04	-	-
BENZO(A)PYRENE	1.75E-04	7.15E-04	-	-
CHRYSENE	2.81E-04	1.25E-03	-	-
INDENO(1,2,3-CD)PYRENE	4.71E-05	1.56E-04	-	-
TOTAL PCBs (AROCHLOR)	8.00E-05	1.44E-04	-	-
TABLE 5-11 CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE) CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	1.70E-03	3.37E-03	7.55E+00	1.50E+01
ALDRIN	1.37E-06	3.97E-06	-	-
HEPTACHLOR EPOXIDE	-	1.86E-06	-	-
HEXACHLOROBENZENE	-	2.20E-06	-	-
p,p'-DDE	2.32E-06	4.24E-06	-	-
BENZO(A)ANTHRACENE	7.36E-05	2.92E-04	-	-
BENZO(A)PYRENE	8.20E-05	3.03E-04	-	-
CHRYSENE	1.23E-04	5.05E-04	-	-
INDENO(1,2,3-CD)PYRENE	2.67E-05	8.06E-05	-	-
TOTAL PCBs (AROCHLOR)	2.99E-04	6.31E-04	-	-

TABLE 5-54
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
FOR SAMPLES COLLECTED FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENS		NONCARCINOGENS	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-13 CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE) CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	4.15E-03	8.23E-03	1.85E+01	3.66E+01
CADMIUM	-	-	-	1.72E+00
MERCURY	-	-	1.53E+00	1.98E+00
ALDRIN	3.35E-06	9.70E-06	-	-
HEPTACHLOR	-	1.27E-06	-	-
HEPTACHLOR EPOXIDE	1.61E-06	4.55E-06	-	-
HEXACHLOROBENZENE	2.14E-05	5.38E-05	-	-
LINDANE (GAMMA-BHC)	-	2.21E-06	-	-
p,p'-DDE	5.67E-06	1.04E-05	-	-
BENZO(A)ANTHRACENE	1.80E-04	7.15E-04	-	-
BENZO(A)PYRENE	2.00E-04	7.41E-04	-	-
CHRYSENE	3.02E-04	1.23E-03	-	-
INDENO(1,2,3-CD)PYRENE	6.54E-05	1.97E-04	-	-
TOTAL PCBs (AROCHLOR)	7.31E-04	1.54E-03	-	-
TABLE 5-15 CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	4.80E-04	1.22E-03	2.13E+00	5.42E+00
ALDRIN	1.48E-06	2.03E-05	-	-
ALPHA-CHLORDANE	-	1.08E-06	-	-
HEXACHLOROBENZENE	-	2.78E-06	-	-
LINDANE (GAMMA-BHC)	-	1.71E-06	-	-
p,p'-DDE	-	1.12E-06	-	-
p,p'-DDT	-	1.04E-06	-	-
BENZO(A)ANTHRACENE	3.80E-06	1.36E-05	-	-
BENZO(A)PYRENE	2.47E-06	8.38E-06	-	-
CHRYSENE	7.73E-06	1.74E-05	-	-
TOTAL PCBs (AROCHLOR)	5.26E-05	1.47E-04	-	-

TABLE 5-54
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
FOR SAMPLES COLLECTED FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENS		NONCARCINOGENS	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-21 CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	1.17E-03	2.98E-03	5.21E+00	1.33E+01
ALDRIN	3.62E-06	4.97E-05	-	-
ALPHA-CHLORDANE	-	2.64E-06	-	-
HEPTACHLOR EPOXIDE	-	1.78E-06	-	-
HEXACHLOROBENZENE	-	6.80E-06	-	-
LINDANE (GAMMA-BHC)	-	4.17E-06	-	-
p,p'-DDD	-	1.78E-06	-	-
p,p'-DDE	-	2.74E-06	-	-
p,p'-DDT	-	2.54E-06	-	-
BENZO(A)ANTHRACENE	9.28E-06	3.33E-05	-	-
BENZO(A)PYRENE	6.03E-06	2.05E-05	-	-
CHRYSENE	1.89E-05	4.26E-05	-	-
TOTAL PCBs (AROCHLOR)	1.28E-04	3.58E-04	-	-
TABLE 5-27 CONSUMPTION OF FLOUNDER FILLET CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	8.17E-04	9.71E-04	3.63E+00	4.32E+00
ALDRIN	1.42E-06	3.23E-06	-	-
HEPTACHLOR EPOXIDE	-	1.73E-06	-	-
HEXACHLOROBENZENE	-	1.22E-06	-	-
p,p'-DDE	-	1.02E-06	-	-
TOTAL PCBs (AROCHLOR)	8.23E-05	1.95E-04	-	-
TABLE 5-32 CONSUMPTION OF FLOUNDER FILLET CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	2.00E-03	2.37E-03	8.88E+00	1.05E+01
ALDRIN	3.46E-06	7.90E-06	-	-
HEPTACHLOR	-	2.09E-06	-	-
HEPTACHLOR EPOXIDE	1.17E-06	4.23E-06	-	-
HEXACHLOROBENZENE	-	2.98E-06	-	-
p,p'-DDE	-	2.48E-06	-	-
p,p'-DDT	-	1.40E-06	-	-
TOTAL PCBs (AROCHLOR)	2.01E-04	4.77E-04	-	-
TABLE 5-37			-	-
INGESTION OF SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS,			-	-
CUMULATIVE CARCINOGENIC RISK	-	1.33E-06	-	-

TABLE 5-55
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
OFF-SHORE RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-2 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT FROM LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT, RECREATIONAL EXPOSURES				
ARSENIC	7.21E-04	1.01E-03	3.21E+00	4.49E+00
ALDRIN	1.52E-06	2.53E-06	–	–
BENZO(A)ANTHRACENE	1.77E-04	2.87E-04	–	–
BENZO(A)PYRENE	1.81E-04	2.92E-04	–	–
CHRYSENE	3.03E-04	5.12E-04	–	–
INDENO(1,2,3-CD)PYRENE	4.32E-05	6.38E-05	–	–
TOTAL PCBs (AROCHLOR)	2.10E-05	2.17E-05	–	–
TABLE 5-3 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND, RECREATIONAL EXPOSURES				
ARSENIC	2.17E-03	2.92E-03	9.63E+00	1.30E+01
HEPTACHLOR EPOXIDE	–	1.39E-06	–	–
BENZO(A)PYRENE	5.41E-06	7.34E-06	–	–
TOTAL PCBs (AROCHLOR)	4.29E-05	5.90E-05	–	–
TABLE 5-4 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	1.61E-03	1.62E-03	7.14E+00	7.20E+00
BENZO(A)ANTHRACENE	3.64E-05	6.80E-05	–	–
BENZO(A)PYRENE	4.29E-05	7.72E-05	–	–
CHRYSENE	6.41E-05	1.00E-04	–	–
INDENO(1,2,3-CD)PYRENE	1.43E-05	2.39E-05	–	–
TOTAL PCBs (ARCHLOR)	3.39E-05	4.44E-05	–	–
TABLE 5-5 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT YORK HARBOR SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
TOTAL PCBs (AROCHLOR)	3.15E-05	*	–	–
TABLE 5-7 CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT FROM LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING				
ARSENIC	5.31E-03	7.43E-03	2.36E+01	3.30E+01
MERCURY	–	–	4.21E+00	*
ALDRIN	1.12E-05	1.86E-05	–	–
HEPTACHLOR	–	1.53E-06		
HEPTACHLOR EPOXIDE	2.36E-06	4.29E-06		
BENZO(A)ANTHRACENE	1.30E-03	2.12E-03	–	–
BENZO(A)PYRENE	1.33E-03	2.15E-03	–	–
CHRYSENE	2.23E-03	3.76E-03	–	–
INDENO(1,2,3-CD)PYRENE	3.18E-04	4.70E-04		
TOTAL PCBs (AROCHLOR)	2.10E-05	2.17E-05	–	–

NOTE – * : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-55
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
OFF-SHORE RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-8				
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING				
ARSENIC	1.59E-02	2.15E-02	7.08E+01	9.54E+01
MERCURY	–	–	5.44E+00	5.61E+00
ALDRIN	5.83E-06	*	–	–
HEPTACHLOR	1.54E-06	*	–	–
HEPTACHLOR EPOXIDE	6.69E-06	1.03E-05	–	–
HEXACHLOROBENZENE	2.19E-06	*	–	–
p,p'- DDE	–	1.07E-06	–	–
BENZO(A)PYRENE	3.98E-05	5.40E-05	–	–
TOTAL PCBs (AROCHLOR)	3.15E-04	4.34E-04	–	–
TABLE 5-9				
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	1.18E-02	1.19E-02	5.25E+01	5.30E+01
MERCURY	–	–	4.77E+00	6.33E+00
ALDRIN	4.56E-06	6.11E-06	–	–
HEPTACHLOR	1.32E-06	1.62E-06	–	–
HEPTACHLOR EPOXIDE	2.59E-06	3.46E-06	–	–
HEXACHLOROBENZENE	1.79E-06	2.22E-06	–	–
LINDANE	–	1.37E-06	–	–
p,p'- DDT	–	1.72E-06	–	–
BENZO(A)ANTHRACENE	2.68E-04	5.00E-04	–	–
BENZO(A)PYRENE	3.16E-04	5.68E-04	–	–
CHRYSENE	4.72E-04	7.39E-04	–	–
INDENO(1,2,3-CD)PYRENE	1.05E-04	1.76E-04	–	–
TOTAL PCBs (AROCHLOR)	2.50E-04	3.27E-04	–	–
TABLE 5-10				
CONSUMPTION OF LOBSTER TAIL FLESH CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ALDRIN	3.29E-06	*	–	–
HEPTACHLOR	1.53E-06	*	–	–
HEPTACHLOR EPOXIDE	5.05E-06	*	–	–
TOTAL PCBs (AROCHLOR)	2.32E-04	*	–	–
TABLE 5-12				
CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE) CAUGHT AT YORK HARBOR SAMPLE LOCATONS, RECREATIONAL EXPOSURES				
TOTAL PCBs (ARCHLOR)	2.87E-05	2.24E-04	–	–

NOTE * : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION, BASED ON A SINGLE SAMPLE

TABLE 5-55
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
OFF-SHORE RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-14 CONSUMPTION OF WHOLE LOBSTER (TAIL FLESH AND HEPATOPANCREAS WEIGHTED AVERAGE) CAUGHT AT YORK HARBOR SAMPLE LOCATONS FOR SUBSISTENCE FISHING				
ALDRIN	5.00E-06	*	–	–
HEPTACHLOR	1.40E-06	1.92E-06	–	–
HEPTACHLOR EPOXIDE	4.60E-06	5.67E-06	–	–
HEXACHLOROBENZENE	–	6.50E-06	–	–
p,p'- DDE	–	1.98E-05	–	–
TOTAL PCBs (ARCHLOR)	2.11E-04	1.65E-03	–	–
TABLE 5-16 CONSUMPTION OF MUSSELS CAUGHT AT THE LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT, RECREATIONAL EXPOSURES				
ARSENIC	5.26E-04	7.10E-04	2.34E+00	3.16E+00
ALDRIN	4.59E-06	2.03E-05	–	–
ALPHA-CHLORDANE	–	1.08E-06	–	–
HEXACHLOROBENZENE	–	2.78E-06	–	–
p,p'- DDE	–	1.12E-06	–	–
p,p'- DDT	–	1.04E-06	–	–
BENZO(A)ANTHRACENE	6.21E-06	1.36E-05	–	–
BENZO(A)PYRENE	4.36E-06	8.38E-06	–	–
CHRYSENE	8.77E-06	1.74E-05	–	–
TOTAL PCBs (AROCHLOR)	4.22E-05	5.69E-05	–	–
TABLE 5-17 CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND, RECREATIONAL EXPOSURES				
ARSENIC	4.01E-04	7.49E-04	1.78E+00	3.33E+00
ALDRIN	–	2.43E-06	–	–
LINDANE	–	1.71E-06	–	–
CHRYSENE	6.86E-06	1.33E-05	–	–
TOTAL PCBs (AROCHLOR)	4.79E-05	1.18E-04	–	–
TABLE 5-18 CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	6.29E-04	1.22E-03	2.80E+00	5.42E+00
ALDRIN	–	1.95E-06	–	–
BENZO(A)ANTHRACENE	4.04E-06	1.11E-05	–	–
CHRYSENE	8.49E-06	1.65E-05	–	–
TOTAL PCBs (ARCHLOR)	6.94E-05	1.46E-04		

NOTE – * : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION, BASED ON A SINGLE SAMPLE

TABLE 5-55
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
OFF-SHORE RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-19 CONSUMPTION OF MUSSELS CAUGHT AT YORK HARBOR SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	3.06E-04	5.38E-04	1.36E+00	2.39E+00
ALDRIN	–	1.07E-06	–	–
HEPTACHLOR	–	1.09E-06	–	–
TOTAL PCBs (AROCHLOR)	3.34E-05	4.06E-05	–	–
TABLE 5-20 CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	6.07E-04	9.88E-04	2.70E+00	4.39E+00
ALDRIN	1.42E-06	1.59E-06	–	–
BENZO(A)ANTHRACENE	1.09E-05	2.21E-05	–	–
BENZO(A)PYRENE	1.27E-05	2.21E-05	–	–
CHRYSENE	1.68E-05	2.94E-05	–	–
TOTAL PCBs (AROCHLOR)	2.20E-05	8.86E-05	–	–
TABLE 5-22 CONSUMPTION OF MUSSELS CAUGHT FROM LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING				
ARSENIC	3.87E-03	5.23E-03	1.72E+01	2.32E+01
CADMIUM	–	–	–	1.10E+00
MERCURY	–	–	1.11E+00	1.57E+00
ALDRIN	3.37E-05	1.50E-04	–	–
ALPHA CHLORDANE	2.36E-06	7.94E-06		
HEXACHLOROBENZENE	4.22E-06	2.05E-05	–	–
p,p'- DDD	1.42E-06	5.34E-06	–	–
p,p'- DDE	2.19E-06	8.24E-06	–	–
p,p'- DDT	1.81E-06	7.64E-06	–	–
BENZO(A)ANTHRACENE	4.57E-05	1.00E-04	–	–
BENZO(A)PYRENE	3.21E-05	6.17E-05	–	–
CHRYSENE	6.46E-05	1.28E-04	–	–
TOTAL PCBs (AROCHLOR)	3.11E-04	4.19E-04	–	–

NOTE – * : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-55
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
OFF-SHORE RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-23				
CONSUMPTION OF MUSSELS CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING				
ARSENIC	2.95E-03	5.51E-03	1.31E+01	2.45E+01
CADMIUM	-	-	1.17E+00	1.87E+00
MERCURY	-	-	-	1.99E+00
ALDRIN	6.82E-06	1.78E-05	-	-
ALPHA-CHLORDANE	-	2.47E-06	-	-
HEPTACHLOR EPOXIDE	-	5.37E-06	-	-
LINDANE	-	1.26E-05	-	-
p,p'- DDD	-	1.27E-06		
p,p'- DDE	-	1.61E-06		
p,p'- DDT	1.06E-06	5.62E-06	-	-
CHRYSENE	5.05E-05	9.82E-05	-	-
TOTAL PCBs (AROCHLOR)	3.53E-04	8.71E-04	-	-
TABLE 5-24				
CONSUMPTION OF MUSSELS CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	4.63E-03	8.98E-03	2.06E+01	3.99E+01
CADMIUM	-	-	1.26E+00	1.58E+00
MERCURY	-	-	-	1.05E+00
ALDRIN	7.06E-06	1.43E-05	-	-
ALPHA-CHLORDANE	1.63E-06	3.50E-06	-	-
p,p'-DDD	1.43E-06	3.94E-06	-	-
p,p'-DDE	1.37E-06	3.63E-06	-	-
p,p'-DDT	-	1.82E-06	-	-
BENZO(A)ANTHRACENE	2.98E-05	8.14E-05	-	-
CHRYSENE	6.25E-05	1.22E-04	-	-
TOTAL PCBs (AROCHLOR)	5.11E-04	1.08E-03	-	-
TABLE 5-25				
CONSUMPTION OF MUSSELS CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	2.25E-03	3.96E-03	1.00E+01	1.76E+01
CADMIUM	-	-	1.04E+00	1.17E+00
MERCURY	-	-	-	1.23E+00
ALDRIN	3.44E-06	7.85E-06	-	-
ALPHA-CHLORDANE	1.17E-06	3.06E-06	-	-
HEPTACHLOR	2.41E-06	8.03E-06	-	-
p,p'- DDT	-	2.34E-06	-	-
TOTAL PCBs (AROCHLOR)	2.46E-04	2.99E-04	-	-

NOTE - * : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION; BASED ON A SINGLE SAMPLE

TABLE 5-55
SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
OFF-SHORE RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-26				
CONSUMPTION OF MUSSELS CAUGHT AT THE GREAT BAY ESTUARY SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	4.47E-03	7.27E-03	1.98E+01	3.23E+01
CADMIUM	–	–	1.50E+00	2.29E+00
MERCURY	–	–	–	1.03E+00
ALDRIN	1.04E-05	1.17E-05	–	–
ALPHA-CHLORDANE	2.18E-06	2.94E-06	–	–
LINDANE	–	1.55E-06	–	–
p,p'- DDD	–	1.40E-06	–	–
p,p'- DDE	1.91E-06	3.56E-06	–	–
p,p'- DDT	–	1.28E-06	–	–
BENZO(A)ANTHRACENE	8.01E-05	1.62E-04	–	–
BENZO(A)PYRENE	9.38E-05	1.62E-04	–	–
CHRYSENE	1.24E-04	2.16E-04	–	–
TOTAL PCBs (AROCHLOR)	1.62E-04	6.52E-04	–	–
TABLE 5-28				
CONSUMPTION OF FLOUNDER FILLET CAUGHT FROM LOWER PISCATAQUA SAMPLE LOCATIONS				
EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT, RECREATIONAL EXPOSURES				
ARSENIC	7.38E-04	* 7.38E-04	3.28E+00	* 3.28E+00
ALDRIN	1.99E-06	3.12E-06	–	–
TOTAL PCBs (AROCHLOR)	3.51E-05	4.50E-05	–	–
TABLE 5-29				
CONSUMPTION OF FLOUNDER FILLET CAUGHT AROUND SEAVEY ISLAND, RECREATIONAL EXPOSURES				
ARSENIC	9.35E-04	9.71E-04	4.15E+00	4.32E+00
ALDRIN	2.16E-06	3.23E-06		
HEPTACHLOR EPOXIDE	1.15E-06	1.73E-06		
HEXACHLOROBENZENE	–	1.22E-06		
TOTAL PCBs (AROCHLOR)	1.05E-04	1.52E-04		
TABLE 5-30				
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
ARSENIC	7.66E-04	9.10E-04	3.40E+00	4.04E+00
TOTAL PCBs (AROCHLOR)	9.89E-05	1.95E-04	–	–
TABLE 5-31				
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT YORK HARBOR SAMPLE LOCATIONS, RECREATIONAL EXPOSURES				
TOTAL PCBs (AROCHLOR)	3.30E-05	3.45E-05	–	–

NOTE * : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION, BASED ON A SINGLE SAMPLE

TABLE 5-55

SUMMARY OF RISKS EXCEEDING NCP RISK GOALS FOR CARCINOGENS AND NONCARCINOGENS
OFF-SHORE RISK ASSESSMENT
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISK		NONCARCINOGENIC RISK	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TABLE 5-33				
CONSUMPTION OF FLOUNDER FILLET CAUGHT FROM LOWER PISCATAQUA SAMPLE LOCATIONS EXCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT FOR SUBSISTENCE FISHING				
ARSENIC	5.43E-03	* 5.43E-03	2.41E+01	* 2.41E+01
ALDRIN	1.46E-05	2.30E-05	–	–
HEPTACHLOR	1.56E-06	* 1.56E-06	–	–
p,p'- DDT	2.20E-06	4.21E-06	–	–
TOTAL PCBs (AROCHLOR)	2.58E-04	3.31E-04	–	–
TABLE 5-34				
CONSUMPTION OF FLOUNDER FILLET CAUGHT AROUND SEAVEY ISLAND FOR SUBSISTENCE FISHING				
ARSENIC	6.88E-03	7.14E-03	3.06E+01	3.18E+01
ALDRIN	1.59E-05	2.38E-05	–	–
ALPHA-CHLORDANE	1.21E-06	1.82E-06	–	–
HEPTACHLOR	4.20E-06	6.30E-06	–	–
HEPTACHLOR EPOXIDE	8.49E-06	1.27E-05	–	–
HEXACHLOROBENZENE	5.97E-06	8.96E-06	–	–
LINDANE	1.21E-06	1.82E-06	–	–
MIREX	1.68E-06	2.52E-06	–	–
p,p'- DDE	2.78E-06	4.20E-06	–	–
TOTAL PCBs (AROCHLOR)	7.69E-04	1.12E-03	–	–
TABLE 5-35				
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT CLARK'S ISLAND EMBAYMENT SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ARSENIC	5.63E-03	6.69E-03	2.50E+01	2.98E+01
ALDRIN	4.78E-06	5.95E-06	–	–
ALPHA-CHLORDANE	1.09E-06	2.58E-06	–	–
HEPTACHLOR	1.27E-06	1.57E-06	–	–
HEPTACHLOR EPOXIDE	2.56E-06	3.18E-06	–	–
HEXACHLOROBENZENE	2.07E-06	4.38E-06	–	–
p,p'- DDD	–	1.55E-06	–	–
p,p'- DDE	3.32E-06	7.48E-06	–	–
TOTAL PCBs (AROCHLOR)	7.28E-04	1.43E-03	–	–
TABLE 5-36				
CONSUMPTION OF FLOUNDER FILLET CAUGHT AT YORK HARBOR SAMPLE LOCATIONS FOR SUBSISTENCE FISHING				
ALPHA-CHLORDANE	1.18E-06	*	–	–
TOTAL PCBs (AROCHLOR)	2.43E-04	*	–	–
TABLE 5-44				
DERMAL CONTACT WITH SEDIMENT FROM AROUND SEAVEY ISLAND				
CUMULATIVE CARCINOGENIC RISK	–	2.89E-06	–	–

NOTE - * : AVERAGE CONCENTRATION EQUALS MAXIMUM CONCENTRATION, BASED ON A SINGLE SAMPLE

TABLE 5-56
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS OF INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT
FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR RECREATIONAL FISHING
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT		COMBINED NON-CARCNINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
INORGANICS												
ALUMINUM	-	-	7.64E-03	1.50E-02	-	-	-	-	-	-	7.64E-03	1.50E-02
ARSENIC	4.80E-04	1.22E-03	2.13E+00	5.42E+00	-	-	-	-	4.80E-04	1.22E-03	2.13E+00	5.42E+00
CADMIUM	-	-	1.53E-01	2.54E-01	-	-	3.11E-06	1.07E-05	-	-	1.53E-01	2.54E-01
CHROMIUM	-	-	5.95E-02	8.94E-02	-	-	-	-	-	-	5.95E-02	8.94E-02
COPPER	-	-	1.67E-02	6.33E-02	-	-	-	-	-	-	1.67E-02	6.33E-02
IRON	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	-	-	1.28E-02	6.02E-02	-	-	-	-	-	-	1.28E-02	6.02E-02
MERCURY	-	-	1.15E-01	2.70E-01	-	-	-	-	-	-	1.15E-01	2.70E-01
NICKEL	-	-	7.76E-03	1.73E-02	-	-	-	-	-	-	7.76E-03	1.73E-02
SILVER	-	-	6.37E-03	6.03E-02	-	-	-	-	-	-	6.37E-03	6.03E-02
ZINC	-	-	4.63E-02	9.28E-02	-	-	-	-	-	-	4.63E-02	9.28E-02
PESTICIDES												
ALDRIN	1.48E-06	2.03E-05	6.78E-03	9.30E-02	-	-	-	-	1.48E-06	2.03E-05	6.78E-03	9.30E-02
ALPHA-CHLORDANE	1.63E-07	1.08E-06	4.87E-03	3.23E-02	-	-	-	-	1.63E-07	1.08E-06	4.87E-03	3.23E-02
HEPTACHLOR	9.27E-08	3.00E-08	9.62E-05	3.11E-05	-	-	-	-	9.27E-08	3.00E-08	9.62E-05	3.11E-05
HEPTACHLOR EPOXIDE	1.04E-07	7.30E-07	2.05E-03	1.44E-02	-	-	-	-	1.04E-07	7.30E-07	2.05E-03	1.44E-02
HEXACHLOROBENZENE	1.14E-07	2.78E-06	2.07E-04	5.07E-03	-	-	-	-	1.14E-07	2.78E-06	2.07E-04	5.07E-03
LINDANE (GAMMA-BHC)	7.09E-08	1.71E-06	4.24E-04	1.02E-02	-	-	-	-	7.09E-08	1.71E-06	4.24E-04	1.02E-02
MIREX	4.74E-08	8.50E-08	3.07E-04	5.51E-04	-	-	-	-	4.74E-08	8.50E-08	3.07E-04	5.51E-04
TRANS-NONACHLOR	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDD	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDE	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDT	-	-	-	-	-	-	-	-	-	-	-	-
p,p'-DDD	1.14E-07	7.26E-07	-	-	-	-	-	-	1.14E-07	7.26E-07	-	-
p,p'-DDE	1.58E-07	1.12E-06	-	-	-	-	-	-	1.58E-07	1.12E-06	-	-
p,p'-DDT	1.49E-07	1.04E-06	2.04E-03	1.42E-02	-	-	-	-	1.49E-07	1.04E-06	2.04E-03	1.42E-02

NOTES:

ND - NO DATA AVAILABLE
AN EXPOSURE SENARIO WAS NOT CALCULATED FOR DERMAL CONTACT WITH SURFACE WATER SINCE SURFACE WATER SAMPLES WERE ONLY ANALYZED FOR INORGANAICS AND CADMIUM WAS NOT DETECTED IN SURFACE WATER SAMPLES.

TABLE 5-56
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS OF INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT
FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR RECREATIONAL FISHING
RECREATIONAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT		COMBINED NON-CARCNINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	-	-	2.83E-06	1.60E-05	-	-	-	-	-	-	2.83E-06	1.60E-05
BENZO(A)ANTHRACENE	3.80E-06	1.36E-05	-	-	-	-	-	-	3.80E-06	1.36E-05	-	-
BENZO(A)PYRENE	2.47E-06	8.38E-06	-	-	-	-	-	-	2.47E-06	8.38E-06	-	-
BENZO(E)PYRENE	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	7.73E-06	1.74E-05	-	-	-	-	-	-	7.73E-06	1.74E-05	-	-
FLUORANTHENE	-	-	1.84E-04	4.99E-04	-	-	-	-	-	-	1.84E-04	4.99E-04
PERYLENE	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	-	-	6.53E-04	2.44E-03	-	-	-	-	-	-	6.53E-04	2.44E-03
PYRENE	-	-	2.34E-04	5.92E-04	-	-	-	-	-	-	2.34E-04	5.92E-04
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	5.26E-05	1.47E-04	-	-	3.54E-09	1.85E-08	-	-	5.26E-05	1.47E-04	-	-
CUMULATIVE TOTALS:	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	5.49E-04	1.44E-03	2.58E+00	6.52E+00	3.54E-09	1.85E-08	3.11E-06	1.07E-05	5.49E-04	1.44E-03	2.58E+00	6.52E+00

NOTES:

ND - NO DATA AVAILABLE
AN EXPOSURE SENARIO WAS NOT CALCULATED FOR DERMAL CONTACT WITH SURFACE WATER SINCE SURFACE WATER SAMPLES WERE ONLY ANALYZED FOR INORGANAICS AND CADMIUM WAS NOT DETECTED IN SURFACE WATER SAMPLES.

TABLE 5-57
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS OF INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT
FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT		COMBINED NON-CARCNINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
INORGANICS												
ALUMINUM	-	-	1.87E-02	3.68E-02	-	-	-	-	-	-	1.87E-02	3.68E-02
ARSENIC	1.17E-03	2.98E-03	5.21E+00	1.33E+01	-	-	-	-	1.17E-03	2.98E-03	5.21E+00	1.33E+01
CADMIUM	-	-	3.73E-01	6.21E-01	-	-	3.11E-06	1.07E-05	-	-	3.73E-01	6.21E-01
CHROMIUM	-	-	1.45E-01	2.18E-01	-	-	-	-	-	-	1.45E-01	2.18E-01
COPPER	-	-	4.07E-02	1.55E-01	-	-	-	-	-	-	4.07E-02	1.55E-01
IRON	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	-	-	3.14E-02	1.47E-01	-	-	-	-	-	-	3.14E-02	1.47E-01
MERCURY	-	-	2.80E-01	6.61E-01	-	-	-	-	-	-	2.80E-01	6.61E-01
NICKEL	-	-	1.90E-02	4.23E-02	-	-	-	-	-	-	1.90E-02	4.23E-02
SILVER	-	-	1.56E-02	1.47E-01	-	-	-	-	-	-	1.56E-02	1.47E-01
ZINC	-	-	1.13E-01	2.27E-01	-	-	-	-	-	-	1.13E-01	2.27E-01
PESTICIDES												
ALDRIN	3.62E-06	4.97E-05	1.66E-02	2.27E-01	-	-	-	-	3.62E-06	4.97E-05	1.66E-02	2.27E-01
ALPHA-CHLORDANE	3.98E-07	2.64E-06	1.19E-02	7.89E-02	-	-	-	-	3.98E-07	2.64E-06	1.19E-02	7.89E-02
HEPTACHLOR	2.27E-07	7.32E-08	2.35E-04	7.59E-05	-	-	-	-	2.27E-07	7.32E-08	2.35E-04	7.59E-05
HEPTACHLOR EPOXIDE	2.54E-07	1.78E-06	5.01E-03	3.52E-02	-	-	-	-	2.54E-07	1.78E-06	5.01E-03	3.52E-02
HEXACHLOROBENZENE	2.78E-07	6.80E-06	5.06E-04	1.24E-02	-	-	-	-	2.78E-07	6.80E-06	5.06E-04	1.24E-02
LINDANE (GAMMA-BHC)	1.73E-07	4.17E-06	1.04E-03	2.50E-02	-	-	-	-	1.73E-07	4.17E-06	1.04E-03	2.50E-02
MIREX	1.16E-07	2.08E-07	7.50E-04	1.35E-03	-	-	-	-	1.16E-07	2.08E-07	7.50E-04	1.35E-03
TRANS-NONACHLOR	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDD	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDE	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDT	-	-	-	-	-	-	-	-	-	-	-	-
p,p'-DDD	2.80E-07	1.78E-06	-	-	-	-	-	-	2.80E-07	1.78E-06	-	-
p,p'-DDE	3.87E-07	2.74E-06	-	-	-	-	-	-	3.87E-07	2.74E-06	-	-
p,p'-DDT	3.64E-07	2.54E-06	4.99E-03	3.48E-02	-	-	-	-	3.64E-07	2.54E-06	4.99E-03	3.48E-02

NOTES:

ND - NO DATA AVAILABLE
AN EXPOSURE SENARIO WAS NOT CALCULATED FOR DERMAL CONTACT WITH SURFACE WATER SINCE SURFACE WATER SAMPLES WERE ONLY ANALYZED FOR INORGANAICS AND CADMIUM WAS NOT DETECTED IN SURFACE WATER SAMPLES.

TABLE 5-57
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS OF INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT
FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS FOR SUBSISTENCE FISHING
RESIDENTIAL EXPOSURES, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT		COMBINED NON-CARCNINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF MUSSELS AND DERMAL CONTACT WITH SEDIMENT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS												
ANTHRACENE	-	-	6.91E-06	3.91E-05	-	-	-	-	-	-	6.91E-06	3.91E-05
BENZO(A)ANTHRACENE	9.28E-06	3.33E-05	-	-	-	-	-	-	9.28E-06	3.33E-05	-	-
BENZO(A)PYRENE	6.03E-06	2.05E-05	-	-	-	-	-	-	6.03E-06	2.05E-05	-	-
BENZO(E)PYRENE	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	1.89E-05	4.26E-05	-	-	-	-	-	-	1.89E-05	4.26E-05	-	-
FLUORANTHENE	-	-	4.50E-04	1.22E-03	-	-	-	-	-	-	4.50E-04	1.22E-03
PERYLENE	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	-	-	1.60E-03	5.97E-03	-	-	-	-	-	-	1.60E-03	5.97E-03
PYRENE	-	-	5.72E-04	1.45E-03	-	-	-	-	-	-	5.72E-04	1.45E-03
POLYCHLORINATED BIPHENYLS (PCBs)												
TOTAL PCBs (AROCHLOR)	1.28E-04	3.58E-04	-	-	3.54E-09	1.85E-08	-	-	1.28E-04	3.58E-04	-	-
CUMULATIVE TOTALS:	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	1.34E-03	3.51E-03	6.30E+00	1.59E+01	3.54E-09	1.85E-08	3.11E-06	1.07E-05	1.34E-03	3.51E-03	6.30E+00	1.59E+01

NOTES:

ND - NO DATA AVAILABLE
AN EXPOSURE SENARIO WAS NOT CALCULATED FOR DERMAL CONTACT WITH SURFACE WATER SINCE SURFACE WATER SAMPLES WERE ONLY ANALYZED FOR INORGANAICS AND CADMIUM WAS NOT DETECTED IN SURFACE WATER SAMPLES.

TABLE 5-58
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS OF INGESTION OF SURFACE WATER AND SEDIMENT AND DERMAL CONTACT WITH SEDIMENT
FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING, AND WADING IN THE RIVER, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT AND SURFACE WATER AND DERMAL CONTACT WITH SEDIEMNT		COMBINED NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT AND SURFACE WATER AND DERMAL CONTACT WITH SEDIEMNT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
INORGANICS																
ALUMINUM	-	-	3.18E-04	7.36E-04	-	-	-	-	-	-	4.29E-07	2.00E-06	-	-	3.18E-04	7.38E-04
ARSENIC	2.53E-07	5.90E-07	1.12E-03	2.62E-03	-	-	-	-	-	-	-	-	2.53E-07	5.90E-07	1.12E-03	2.62E-03
CADMIUM	-	-	1.59E-05	5.48E-05	-	-	3.11E-06	1.07E-05	-	-	-	-	-	-	1.90E-05	6.55E-05
CHROMIUM	-	-	5.97E-04	1.16E-03	-	-	-	-	-	-	-	-	-	-	5.97E-04	1.16E-03
COPPER	-	-	3.20E-05	7.77E-05	-	-	-	-	-	-	-	-	-	-	3.20E-05	7.77E-05
IRON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	-	-	8.36E-05	1.48E-04	-	-	-	-	-	-	-	-	-	-	8.36E-05	1.48E-04
MERCURY	-	-	2.05E-05	6.12E-05	-	-	-	-	-	-	-	-	-	-	2.05E-05	6.12E-05
NICKEL	-	-	3.82E-05	1.25E-04	-	-	-	-	-	-	-	-	-	-	3.82E-05	1.25E-04
SILVER	-	-	3.25E-06	7.12E-06	-	-	-	-	-	-	-	-	-	-	3.25E-06	7.12E-06
ZINC	-	-	1.73E-05	7.26E-05	-	-	-	-	-	-	-	-	-	-	1.73E-05	7.26E-05
PESTICIDES																
ALDRIN	3.35E-10	4.47E-09	1.53E-06	2.05E-05	-	-	-	-	-	-	-	-	3.35E-10	4.47E-09	1.53E-06	2.05E-05
ALPHA-CHLORDANE	1.05E-11	4.46E-11	3.13E-07	1.33E-06	-	-	-	-	-	-	-	-	1.05E-11	4.46E-11	3.13E-07	1.33E-06
HEXACHLOROBENZENE	1.13E-11	1.35E-10	2.06E-08	2.47E-07	-	-	-	-	-	-	-	-	1.13E-11	1.35E-10	2.06E-08	2.47E-07
LINDANE (GAMMA-BHC)	6.20E-12	1.62E-11	3.71E-08	9.72E-08	-	-	-	-	-	-	-	-	6.20E-12	1.62E-11	3.71E-08	9.72E-08
MIREX	9.43E-12	3.59E-11	6.11E-08	2.33E-07	-	-	-	-	-	-	-	-	9.43E-12	3.59E-11	6.11E-08	2.33E-07
TRANS-NONACHLOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p,p'-DDD	1.24E-11	5.38E-11	-	-	-	-	-	-	-	-	-	-	1.24E-11	5.38E-11	-	-
p,p'-DDE	9.24E-12	2.55E-11	-	-	-	-	-	-	-	-	-	-	9.24E-12	2.55E-11	-	-
p,p'-DDT	5.05E-11	4.77E-10	6.93E-07	6.55E-06	-	-	-	-	-	-	-	-	5.05E-11	4.77E-10	6.93E-07	6.55E-06

ND - NO DATA AVAILABLE
AN EXPOSURE SENARIO WAS NOT CALCULATED FOR DERMAL CONTACT WITH SURFACE WATER SINCE SURFACE WATER SAMPLES WERE ONLY ANALYZED FOR INORGANAICS AND CADMIUM WAS NOT DETECTED IN SURFACE WATER SAMPLES.

TABLE 5-58
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS OF INGESTION OF SURFACE WATER AND SEDIMENT AND DERMAL CONTACT WITH SEDIMENT
FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING, AND WADING IN THE RIVER, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT AND SURFACE WATER AND DERMAL CONTACT WITH SEDIEMNT		COMBINED NONCARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT AND SURFACE WATER AND DERMAL CONTACT WITH SEDIEMNT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS																
ANTHRACENE	-	-	2.20E-08	1.74E-07	-	-	-	-	-	-	-	-	-	-	2.20E-08	1.74E-07
BENZO(A)ANTHRACENE	3.28E-08	2.45E-07	-	-	-	-	-	-	-	-	-	-	3.28E-08	2.45E-07	-	-
BENZO(A)PYRENE	3.28E-08	1.57E-07	-	-	-	-	-	-	-	-	-	-	3.28E-08	1.57E-07	-	-
BENZO(E)PYRENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	-	-	1.33E-06	4.52E-06	-	-	-	-	-	-	-	-	-	-	1.33E-06	4.52E-06
CHRYSENE	3.31E-08	2.18E-07	-	-	-	-	-	-	-	-	-	-	3.31E-08	2.18E-07	-	-
DIBENZO(A,H)ANTHRACENE	3.89E-09	1.63E-08	-	-	-	-	-	-	-	-	-	-	3.89E-09	1.63E-08	-	-
FLUORANTHENE	-	-	7.81E-07	9.59E-06	-	-	-	-	-	-	-	-	-	-	7.81E-07	9.59E-06
FLUORENE	-	-	5.25E-08	7.53E-07	-	-	-	-	-	-	-	-	-	-	5.25E-08	7.53E-07
INDENO(1,2,3-CD)PYRENE	1.47E-08	6.47E-08	-	-	-	-	-	-	-	-	-	-	1.47E-08	6.47E-08	-	-
PERYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	-	-	4.29E-06	4.25E-05	-	-	-	-	-	-	-	-	-	-	4.29E-06	4.25E-05
PYRENE	-	-	8.93E-07	9.13E-06	-	-	-	-	-	-	-	-	-	-	8.93E-07	9.13E-06
POLYCHLORINATED BIPHENYLS (PCBs)																
TOTAL PCBs (AROCHLOR)	6.06E-09	3.14E-08	-	-	3.54E-09	1.85E-08	-	-	-	-	-	-	9.60E-09	4.99E-08	-	-
CUMULATIVE TOTALS:	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	3.76E-07	1.33E-06	2.26E-03	5.16E-03	3.54E-09	1.85E-08	3.11E-06	1.07E-05	-	-	4.29E-07	2.00E-06	3.80E-07	1.35E-06	2.26E-03	5.17E-03

ND - NO DATA AVAILABLE
AN EXPOSURE SENARIO WAS NOT CALCULATED FOR DERMAL CONTACT WITH SURFACE WATER SINCE SURFACE WATER SAMPLES WERE ONLY ANALYZED FOR INORGANAICS AND CADMIUM WAS NOT DETECTED IN SURFACE WATER SAMPLES.

TABLE 5-59
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS FOR INGESTION OF SEDIMENT, SURFACE WATER, AND LOBSTER TAIL FLESH
AND DERMAL CONTACT WITH SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING, AND WADING IN THE RIVER, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF LOBSTER TAIL FLESH		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF LOBSTER TAIL FLESH		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS		COMBINED NONCARCINOGENIC CHEMICAL SPECIFIC RISKS	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
INORGANICS																				
ALUMINUM	-	-	3.18E-04	7.36E-04	-	-	-	-	-	-	4.29E-07	2.00E-06	-	-	1.72E-03	4.67E-03	-	-	2.03E-03	5.41E-03
ARSENIC	2.53E-07	5.90E-07	1.12E-03	2.62E-03	-	-	-	-	-	-	-	-	1.50E-03	2.92E-03	6.66E+00	1.30E+01	1.50E-03	2.92E-03	6.66E+00	1.30E+01
CADMIUM	-	-	1.59E-05	5.48E-05	-	-	3.11E-06	1.07E-05	-	-	-	-	-	-	4.37E-03	6.06E-03	-	-	4.39E-03	6.13E-03
CHROMIUM	-	-	5.97E-04	1.16E-03	-	-	-	-	-	-	-	-	-	-	2.54E-02	3.65E-02	-	-	2.60E-02	3.77E-02
COPPER	-	-	3.20E-05	7.77E-05	-	-	-	-	-	-	-	-	-	-	1.07E-01	1.17E-01	-	-	1.07E-01	1.17E-01
IRON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	-	-	8.36E-05	1.48E-04	-	-	-	-	-	-	-	-	-	-	5.08E-03	7.87E-03	-	-	5.16E-03	8.01E-03
MERCURY	-	-	2.05E-05	6.12E-05	-	-	-	-	-	-	-	-	-	-	6.70E-01	8.60E-01	-	-	6.70E-01	8.60E-01
NICKEL	-	-	3.82E-05	1.25E-04	-	-	-	-	-	-	-	-	-	-	4.37E-03	9.48E-03	-	-	4.41E-03	9.60E-03
SILVER	-	-	3.25E-06	7.12E-06	-	-	-	-	-	-	-	-	-	-	2.13E-02	3.34E-02	-	-	2.13E-02	3.34E-02
ZINC	-	-	1.73E-05	7.26E-05	-	-	-	-	-	-	-	-	-	-	6.31E-02	7.40E-02	-	-	6.31E-02	7.41E-02
PESTICIDES																				
ALDRIN	3.35E-10	4.47E-09	1.53E-06	2.05E-05	-	-	-	-	-	-	-	-	9.16E-07	1.92E-06	4.19E-03	8.80E-03	9.17E-07	1.93E-06	4.19E-03	8.82E-03
ALPHA-CHLORDANE	1.05E-11	4.46E-11	3.13E-07	1.33E-06	-	-	-	-	-	-	-	-	5.81E-08	9.46E-08	1.74E-03	2.83E-03	5.81E-08	9.46E-08	1.74E-03	2.83E-03
HEPTACHLOR	-	-	-	-	-	-	-	-	-	-	-	-	1.71E-07	2.20E-07	1.78E-04	2.28E-04	1.71E-07	2.20E-07	1.78E-04	2.28E-04
HEPTACHLOR EPOXIDE	-	-	-	-	-	-	-	-	-	-	-	-	5.01E-07	1.42E-06	9.88E-03	2.81E-02	5.01E-07	1.42E-06	9.88E-03	2.81E-02
HEXACHLOROBENZENE	1.13E-11	1.35E-10	2.06E-08	2.47E-07	-	-	-	-	-	-	-	-	2.13E-07	3.01E-07	3.88E-04	5.49E-04	2.13E-07	3.01E-07	3.88E-04	5.49E-04
LINDANE (GAMMA-BHC)	6.20E-12	1.62E-11	3.71E-08	9.72E-08	-	-	-	-	-	-	-	-	6.50E-08	1.87E-07	3.89E-04	1.12E-03	6.51E-08	1.87E-07	3.89E-04	1.12E-03
MIREX	9.43E-12	3.59E-11	6.11E-08	2.33E-07	-	-	-	-	-	-	-	-	7.17E-08	8.79E-08	4.65E-04	5.70E-04	7.18E-08	8.79E-08	4.65E-04	5.70E-04
TRANS-NONACHLOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o,p'-DDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p,p'-DDD	1.24E-11	5.38E-11	-	-	-	-	-	-	-	-	-	-	1.45E-08	2.57E-08	-	-	1.45E-08	2.58E-08	-	-
p,p'-DDE	9.24E-12	2.55E-11	-	-	-	-	-	-	-	-	-	-	7.98E-08	1.45E-07	-	-	7.98E-08	1.45E-07	-	-
p,p'-DDT	5.05E-11	4.77E-10	6.93E-07	6.55E-06	-	-	-	-	-	-	-	-	5.39E-08	2.34E-07	7.40E-04	3.21E-03	5.39E-08	2.34E-07	7.40E-04	3.21E-03

TABLE 5-59
POTENTIAL COMBINED RISKS CALCULATED FOR COMBINED PATHWAYS FOR INGESTION OF SEDIMENT, SURFACE WATER, AND LOBSTER TAIL FLESH
AND DERMAL CONTACT WITH SEDIMENT FROM THE LOWER PISCATAQUA SAMPLE LOCATIONS
RECREATIONAL EXPOSURES WHILE SWIMMING, FISHING, AND WADING IN THE RIVER, OFF-SHORE IMPACTS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR DERMAL CONTACT WITH SEDIMENT		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF SURFACE WATER		CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF LOBSTER TAIL FLESH		NON-CARCINOGENIC CHEMICAL SPECIFIC RISKS FOR INGESTION OF LOBSTER TAIL FLESH		COMBINED CARCINOGENIC CHEMICAL SPECIFIC RISKS		COMBINED NONCARCINOGENIC CHEMICAL SPECIFIC RISKS	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS																				
ANTHRACENE	-	-	2.20E-08	1.74E-07	-	-	-	-	-	-	-	-	-	-	3.80E-05	2.03E-04	-	-	3.81E-05	2.03E-04
BENZO(A)ANTHRACENE	3.28E-08	2.45E-07	-	-	-	-	-	-	-	-	-	-	6.69E-05	2.87E-04	-	-	6.69E-05	2.88E-04	-	-
BENZO(A)PYRENE	3.28E-08	1.57E-07	-	-	-	-	-	-	-	-	-	-	7.16E-05	2.92E-04	-	-	7.16E-05	2.93E-04	-	-
BENZO(E)PYRENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	-	-	1.33E-06	4.52E-06	-	-	-	-	-	-	-	-	-	-	1.98E-03	6.32E-03	-	-	1.98E-03	6.33E-03
CHRYSENE	3.31E-08	2.18E-07	-	-	-	-	-	-	-	-	-	-	1.15E-04	5.12E-04	-	-	1.15E-04	5.12E-04	-	-
DIBENZO(A,H)ANTHRACENE	3.89E-09	1.63E-08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.89E-09	1.63E-08	0.00E+00	0.00E+00
FLUORANTHENE	-	-	7.81E-07	9.59E-06	-	-	-	-	-	-	-	-	-	-	3.55E-03	1.57E-02	-	-	3.55E-03	1.57E-02
FLUORENE	-	-	5.25E-08	7.53E-07	-	-	-	-	-	-	-	-	-	-	2.71E-04	1.27E-03	-	-	2.71E-04	1.27E-03
INDENO(1,2,3-CD)PYRENE	1.47E-08	6.47E-08	-	-	-	-	-	-	-	-	-	-	1.93E-05	6.38E-05	-	-	1.93E-05	6.39E-05	-	-
PERYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	-	-	4.29E-06	4.25E-05	-	-	-	-	-	-	-	-	-	-	1.21E-02	6.17E-02	-	-	1.21E-02	6.18E-02
PYRENE	-	-	8.93E-07	9.13E-06	-	-	-	-	-	-	-	-	-	-	3.96E-03	1.70E-02	-	-	3.96E-03	1.70E-02
POLYCHLORINATED BIPHENYLS (PCBs)																				
TOTAL PCBs (AROCHLOR)	6.06E-09	3.14E-08	-	-	3.54E-09	1.85E-08	-	-	-	-	-	-	3.27E-05	5.91E-05	-	-	3.27E-05	5.91E-05	-	-
CUMULATIVE TOTALS:	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	3.76E-07	1.33E-06	2.26E-03	5.16E-03	3.54E-09	1.85E-08	3.11E-06	1.07E-05	-	-	4.29E-07	2.00E-06	1.81E-03	4.14E-03	7.60E+00	1.43E+01	1.81E-03	4.14E-03	7.60E+00	1.43E+01

TABLE 5-60
COMPARISON OF CHEMICAL CONCENTRATIONS IN LOBSTER TAIL FLESH FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM YORK HARBOR#		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT		FDA ACTION LEVELS FOR THE EDIBLE PORTION OF FISH+
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	
INORGANICS											
ALUMINUM	2.2133	2.5338	10.2058	18.2970	6.7292	18.2970	NA	NA	7.7685	12.0652	NR
ARSENIC	3.9050	5.2600	2.8950	2.9200	2.7000	5.2600	NA	NA	1.3000	1.8200	NR
CADMIUM	0.0062	0.0062	0.0049	0.0076	0.0059	0.0109	NA	NA	0.0066	0.0109	NR
CHROMIUM	0.1397	0.1442	0.1889	0.2470	0.1717	0.2470	NA	NA	0.1866	0.1887	NR
COPPER	5.7748	5.8504	4.9405	5.7770	5.3747	5.8504	NA	NA	5.4088	5.8483	NR
IRON	3.4750	4.7200	29.4400	54.9100	16.0517	54.9100	NA	NA	15.2400	21.1400	NR
LEAD	0.0165	0.0210	0.0625	0.1160	0.0402	0.1160	NA	NA	0.0415	0.0440	NR
MANGANESE	0.5392	0.7488	0.6852	0.7600	0.6863	1.0633	NA	NA	0.8346	1.0633	NR
MERCURY	0.3001	0.3090	0.2628	0.3488	0.2716	0.3488	NA	NA	0.2322	0.2322	1.00*
NICKEL	0.0421	0.0666	0.1072	0.1729	0.1181	0.2563	NA	NA	0.2052	0.2563	NR
SILVER	0.1047	0.1414	0.1693	0.1729	0.1442	0.2260	NA	NA	0.1586	0.2260	NR
ZINC	19.5530	20.0100	16.5755	18.3120	17.0493	20.0100	NA	NA	15.0195	15.8910	NR
PESTICIDES											
ALDRIN	0.00015	0.00015	0.00012	0.00015	0.00017	0.00047	0.00008	0.00008	0.00028	0.00047	0.30
ALPHA-CHLORDANE	0.00015	0.00015	0.00016	0.00023	0.00014	0.00023	0.00026	0.00026	0.00010	0.00015	NR
HEPTACHLOR	0.00015	0.00015	0.00013	0.00015	0.00012	0.00015	0.00015	0.00015	0.00008	0.00015	0.30
HEPTACHLOR EPOXIDE	0.00032	0.00048	0.00012	0.00016	0.00017	0.00048	0.00024	0.00024	0.00011	0.00020	0.30
HEXACHLOROBENZENE	0.00059	0.00059	0.00048	0.00059	0.00042	0.00059	0.00014	0.00014	0.00016	0.00019	0.30
LINDANE (GAMMA-BHC)	0.00015	0.00015	0.00022	0.00045	0.00016	0.00045	0.00008	0.00008	0.00008	0.00009	NR
MIREX	0.00015	0.00015	0.00013	0.00015	0.00013	0.00015	0.00015	0.00015	0.00012	0.00015	0.10
TRANS-NONACHLOR	0.00015	0.00015	0.00018	0.00026	0.00016	0.00026	0.00013	0.00013	0.00016	0.00018	NR

NOTES:

ALL VALUES ARE REPORTED IN MG/KG
ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NR: VALUE WAS NOT REPORTED BY THE FOOD AND DRUG ADMINISTRATION (FDA)
+ : VALUES REPORTED IN THIS COLUMN WERE DERRIVED FROM
ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
PUBLISHED BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH SERVICE, FOOD AND DRUG ADMINISTRATION, (617-023/68013). 1992
* : VALUE ESTABLISHED FOR METHYL MERCURY
# : VALUES REPRESENT A SINGLE SAMPLE
LOBSTER SAMPLES WERE NOT COLLECTED FROM THE GREAT BAY ESTUARY

TABLE 5-60
COMPARISON OF CHEMICAL CONCENTRATIONS IN LOBSTER TAIL FLESH FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM YORK HARBOR#		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT		FDA ACTION LEVELS FOR THE EDIBLE PORTION OF FISH+
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	
o,p'-DDD	0.00025	0.00035	0.00015	0.00015	0.00017	0.00035	0.00015	0.00015	0.00013	0.00015	NR
o,p'-DDE	0.00015	0.00015	0.00012	0.00015	0.00013	0.00015	0.00015	0.00015	0.00013	0.00015	5.00
o,p'-DDT	0.00015	0.00015	0.00012	0.00015	0.00013	0.00015	0.00015	0.00015	0.00013	0.00015	5.00
p,p'-DDD	0.00015	0.00015	0.00023	0.00034	0.00019	0.00034	0.00039	0.00039	0.00016	0.00018	NR
p,p'-DDE	0.00118	0.00134	0.00066	0.00084	0.00074	0.00134	0.00081	0.00081	0.00042	0.00056	5.00
p,p'-DDT	0.00015	0.00015	0.00094	0.00217	0.00050	0.00217	0.00019	0.00019	0.00019	0.00024	5.00
POLYAROMATIC HYDROCARBONS											
ANTHRACENE	ND	ND	0.00695	0.01554	0.01543	0.08215	NA	NA	0.04213	0.08215	NR
BENZO(A)ANTHRACENE	ND	ND	0.01981	0.03696	0.03637	0.15635	NA	NA	0.09604	0.15635	NR
BENZO(A)PYRENE	0.00294	0.00399	0.02335	0.04200	0.03893	0.15900	NA	NA	0.09830	0.15900	NR
BENZO(E)PYRENE	ND	ND	0.03627	0.05880	0.04860	0.18020	NA	NA	0.11360	0.18020	NR
BENZO(G,H,I)PERYLENE	ND	ND	0.00846	0.01344	0.01071	0.03419	NA	NA	0.02273	0.03419	NR
CHRYSENE	ND	ND	0.03487	0.05460	0.06258	0.27825	NA	NA	0.16498	0.27825	NR
DIBENZO(A,H)ANTHRACENE	ND	ND	ND	ND	ND	ND	NA	NA	ND	ND	NR
FLOURANTHENE	0.00562	0.00935	0.11429	0.20160	0.19187	0.84800	NA	NA	0.49450	0.84800	NR
FLOURENE	ND	ND	0.01041	0.02016	0.01467	0.06890	NA	NA	0.03504	0.06890	NR
INDENO(1,2,3-CD)PYRENE	ND	ND	0.00780	0.01302	0.01047	0.03472	NA	NA	0.02347	0.03472	NR
PERYLENE	ND	ND	0.01363	0.02100	0.01706	0.05565	NA	NA	0.03793	0.05565	NR
PHENANTHRENE	0.00200	0.00273	0.03220	0.05460	0.06516	0.33390	NA	NA	0.17776	0.33390	NR
PYRENE	0.00410	0.00630	0.10436	0.20580	0.16044	0.68900	NA	NA	0.40090	0.68900	NR
POLYCHLORINATED BIPHENYLS											
TOTAL PCBs (AROCHLOR)	0.01756	0.02417	0.01390	0.01820	0.01341	0.02420	0.01290	0.01290	0.00860	0.00890	NR

NOTES:

ALL VALUES ARE REPORTED IN MG/KG
ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NR: VALUE WAS NOT REPORTED BY THE FOOD AND DRUG ADMINISTRATION (FDA)
+ : VALUES REPORTED IN THIS COLUMN WERE DERRIVED FROM
ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
PUBLISHED BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH SERVICE, FOOD AND DRUG ADMINISTRATION, (617-023/68013). 1992
* : VALUE ESTABLISHED FOR METHYL MERCURY
# : VALUES REPRESENT A SINGLE SAMPLE
LOBSTER SAMPLES WERE NOT COLLECTED FROM THE GREAT BAY ESTUARY

TABLE 5-61
COMPARISON OF CHEMICAL CONCENTRATIONS IN MUSSELS FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM YORK HARBOR		SAMPLES COLLECTED FROM THE GREAT BAY ESTUARY		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT		FDA ACTION LEVELS FOR THE EDIBLE PORTION OF FISH+
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	
INORGANICS													
ALUMINUM	28.193	58.986	30.508	46.980	24.930	34.034	44.088	66.234	29.968	58.986	34.303	53.703	NR
ARSENIC	0.722	1.350	1.134	2.200	0.551	0.970	1.094	1.780	0.865	2.200	0.948	1.280	NR
CADMIUM	0.214	0.343	0.231	0.290	0.191	0.216	0.276	0.421	0.206	0.343	0.167	0.203	NR
CHROMIUM	0.369	0.488	0.452	0.604	0.263	0.339	0.615	0.843	0.402	0.604	0.425	0.503	NR
COPPER	0.868	3.165	0.875	1.268	0.860	0.955	0.979	1.122	0.833	3.165	0.680	0.783	NR
IRON	63.418	128.700	65.894	96.560	50.765	62.060	88.980	121.980	65.171	128.700	68.314	102.260	NR
LEAD	1.020	3.120	1.133	1.857	0.263	0.385	0.528	0.661	1.032	3.120	0.823	1.350	NR
MANGANESE	1.730	8.136	1.928	5.693	1.189	1.450	5.738	11.270	1.734	8.136	1.273	1.634	NR
MERCURY	0.046	0.110	0.038	0.058	0.042	0.068	0.040	0.057	0.047	0.110	0.061	0.086	1.00*
NICKEL	0.193	0.351	0.250	0.468	0.155	0.200	0.270	0.308	0.210	0.468	0.195	0.293	NR
SILVER	0.024	0.290	0.103	0.408	0.013	0.018	0.206	0.274	0.043	0.408	0.016	0.021	NR
ZINC	11.985	25.086	13.869	18.480	11.387	12.963	14.786	18.744	12.518	25.086	12.254	18.900	NR
PESTICIDES													
ALDRIN	0.00017	0.00045	0.00018	0.00036	0.00009	0.00020	0.00026	0.00030	0.00028	0.00377	0.00085	0.00377	0.30
ALPHA-CHLORDANE	0.00026	0.00081	0.00054	0.00115	0.00039	0.00101	0.00072	0.00097	0.00040	0.00262	0.00078	0.00262	NR
HEPTACHLOR	ND	ND	0.00006	0.00002	0.00023	0.00077	ND	ND	0.00007	0.00002	ND	ND	0.30
HEPTACHLOR EPOXIDE	0.00003	0.00025	0.00003	0.00001	ND	ND	ND	ND	0.00004	0.00025	ND	ND	0.30
HEXACHLOROBENZENE	ND	ND	0.00010	0.00003	ND	ND	ND	ND	0.00022	0.00548	0.00113	0.00548	0.30
LINDANE (GAMMA-BHC)	0.00024	0.00414	0.00006	0.00015	ND	ND	0.00013	0.00051	0.00017	0.00414	ND	ND	NR
MIREX	ND	ND	0.00007	0.00015	ND	ND	ND	ND	0.00008	0.00015	ND	ND	0.10
TRANS-NONACHLOR	0.00025	0.00055	0.00048	0.00121	0.00057	0.00117	0.00059	0.00087	0.00038	0.00265	0.00078	0.00265	NR
o,p'-DDD	0.00013	0.00082	0.00041	0.00137	0.00031	0.00053	0.00027	0.00050	0.00025	0.00196	0.00045	0.00196	NR
o,p'-DDE	0.00009	0.00017	0.00007	0.00009	ND	ND	ND	ND	0.00009	0.00017	ND	ND	5.00
o,p'-DDT	0.00039	0.00347	0.00024	0.00061	0.00010	0.00023	0.00009	0.00024	0.00031	0.00347	ND	ND	5.00
p,p'-DDD	0.00086	0.00228	0.00256	0.00705	0.00078	0.00100	0.00165	0.00249	0.00150	0.00954	0.00254	0.00954	NR
p,p'-DDE	0.00107	0.00203	0.00173	0.00457	0.00073	0.00089	0.00241	0.00449	0.00147	0.01038	0.00276	0.01038	5.00
p,p'-DDT	0.00133	0.00709	0.00102	0.00229	0.00110	0.00296	0.00063	0.00161	0.00138	0.00963	0.00228	0.00963	5.00

NOTES:
ALL VALUES ARE REPORTED IN MG/KG
ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NR: VALUE WAS NOT REPORTED BY THE FOOD AND DRUG ADMINISTRATION (FDA)
+ : VALUES REPORTED IN THIS COLUMN WERE DERRIVED FROM
ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
PUBLISHED BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH SERVICE, FOOD AND DRUG ADMINISTRATION, (617-023/68013). 1992
* : VALUE ESTABLISHED FOR METHYL MERCURY

TABLE 5-61
COMPARISON OF CHEMICAL CONCENTRATIONS IN MUSSELS FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM YORK HARBOR		SAMPLES COLLECTED FROM THE GREAT BAY ESTUARY		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT		FDA ACTION LEVELS FOR THE EDIBLE PORTION OF FISH+
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	
POLYAROMATIC HYDROCARBONS													
ANTHRACENE	0.00173	0.00649	0.00220	0.00602	ND	ND	ND	ND	0.00115	0.00649	ND	ND	NR
BENZO(A)ANTHRACENE	ND	ND	ND	ND	ND	ND	0.00592	0.01200	0.00206	0.00741	0.00338	0.00741	NR
BENZO(A)PYRENE	ND	ND	ND	ND	ND	ND	0.00693	0.01200	0.00134	0.00456	0.00237	0.00456	NR
BENZO(E)PYRENE	0.00356	0.00765	0.00642	0.01320	ND	ND	0.01504	0.02800	0.00470	0.01320	0.00491	0.00767	NR
CHRYSENE	0.00373	0.00726	0.00462	0.00900	ND	ND	0.00914	0.01600	0.00420	0.00948	0.00477	0.00948	NR
FLUORANTHENE	0.00886	0.01395	0.01121	0.02700	0.00501	0.00705	0.01168	0.01800	0.00997	0.02700	0.01084	0.02210	NR
PERYLENE	0.00190	0.00420	0.00204	0.00392	ND	ND	0.00723	0.01100	0.00193	0.00420	0.00189	0.00403	NR
PHENANTHRENE	0.00349	0.00564	0.00275	0.00525	0.00345	0.00645	0.00158	0.00418	0.00353	0.01320	0.00486	0.01320	NR
PYRENE	0.00805	0.01328	0.01107	0.02400	0.00321	0.00570	0.01756	0.03500	0.00949	0.02400	0.01071	0.02080	NR
POLYCHLORINATED BIPHENYLS													
TOTAL PCBs (AROCHLOR)	0.01963	0.04847	0.02843	0.06000	0.01367	0.01663	0.00901	0.03629	0.02153	0.06002	0.01730	0.02330	NR

NOTES:
ALL VALUES ARE REPORTED IN MG/KG
ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NR: VALUE WAS NOT REPORTED BY THE FOOD AND DRUG ADMINISTRATION (FDA)
+ : VALUES REPORTED IN THIS COLUMN WERE DERRIVED FROM
ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
PUBLISHED BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH SERVICE, FOOD AND DRUG ADMINISTRATION, (617-023/68013). 1992
* : VALUE ESTABLISHED FOR METHYL MERCURY

TABLE 5-62
COMPARISON OF CHEMICAL CONCENTRATIONS IN FLOUNDER FILLET SAMPLES FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM YORK HARBOR		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT		FDA ACTION LEVELS FOR THE EDIBLE PORTION OF FISH+
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	
INORGANICS											
ALUMINUM	1.0850	1.2500	2.1579	2.6796	1.5911	2.6796	NA	NA	0.9030	0.9030	NR
ARSENIC	1.6850	1.7500	1.3800	1.6400	1.4733	1.7500	NA	NA	1.3300	1.3300	NR
CADMIUM	ND	ND	0.0059	0.0117	0.0045	0.0117	NA	NA	ND	ND	NR
CHROMIUM	0.2365	0.3250	0.1725	0.2574	0.1852	0.3250	NA	NA	0.1204	0.1204	NR
COPPER	0.2313	0.2425	0.2648	0.3510	0.2342	0.3510	NA	NA	0.1483	0.1483	NR
IRON	2.8350	3.7700	5.4167	6.4300	3.9900	6.4300	NA	NA	2.0200	2.0200	NR
LEAD	0.0555	0.0950	0.0370	0.0490	0.0388	0.0950	NA	NA	0.0110	0.0110	NR
MANGANESE	0.4205	0.7750	0.2758	0.5850	0.2920	0.7750	NA	NA	0.0839	0.0839	NR
MERCURY	0.0135	0.0220	0.0316	0.0351	0.0219	0.0351	NA	NA	0.0193	0.0193	1.00*
NICKEL	0.1385	0.1520	0.1578	0.1766	0.1444	0.1766	NA	NA	0.1161	0.1161	NR
SILVER	ND	ND	0.0065	0.0142	0.0059	0.0142	NA	NA	0.0086	0.0086	NR
ZINC	8.7125	10.5250	7.4790	9.6170	7.5180	10.5250	NA	NA	5.2460	5.2460	NR

NOTES:

ALL VALUES ARE REPORTED IN MG/KG
ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NR: VALUE WAS NOT REPORTED BY THE FOOD AND DRUG ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
+ : VALUES REPORTED IN THIS COLUMN WERE DERRIVED FROM
ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
PUBLISHED BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH SERVICE, FOOD AND DRUG ADMINISTRATION, (617-023/68013). 1992
* : VALUE ESTABLISHED FOR METHYL MERCURY
# : VALUE REPRESENTS A SINGLE SAMPLE.
FLOUNDER SAMPLES WERE NOT COLLECTED FROM THE GREAT BAY ESTUARY.

TABLE 5-62
COMPARISON OF CHEMICAL CONCENTRATIONS IN FLOUNDER FILLET SAMPLES FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM YORK HARBOR		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT		FDA ACTION LEVELS FOR THE EDIBLE PORTION OF FISH+
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	
PESTICIDES											
ALDRIN	0.00040	0.00060	0.00012	0.00015	0.00026	0.00060	ND	ND	0.00037	0.00058	0.30
ALPHA-CHLORDANE	0.00040	0.00060	0.00036	0.00085	0.00030	0.00085	0.00039#	0.00039#	0.00016	0.00016	NR
HEPTACHLOR	0.00040	0.00060	0.00012	0.00015	0.00020	0.00060	ND	ND	0.00015	0.00015	0.30
HEPTACHLOR EPOXIDE	0.00040	0.00060	0.00012	0.00015	0.00017	0.00060	ND	ND	0.00003	0.00003	0.30
HEXACHLOROBENZENE	0.00160	0.00240	0.00055	0.00117	0.00074	0.00240	ND	ND	0.00013	0.00016	0.30
LINDANE (GAMMA-BHC)	0.00040	0.00060	0.00010	0.00014	0.00018	0.00060	ND	ND	0.00006	0.00007	NR
MIREX	0.00040	0.00060	0.00012	0.00015	0.00020	0.00060	ND	ND	0.00015	0.00015	0.10
TRANS-NONACHLOR	0.00080	0.00110	0.00072	0.00133	0.00059	0.00133	0.00019#	0.00019#	0.00023	0.00031	NR
o,p'-DDD	0.00040	0.00060	0.00030	0.00046	0.00027	0.00060	ND	ND	0.00015	0.00015	NR
o,p'-DDE	0.00040	0.00060	0.00015	0.00031	0.00021	0.00060	ND	ND	0.00014	0.00015	5.00
o,p'-DDT	0.00040	0.00060	0.00037	0.00083	0.00041	0.00089	ND	ND	0.00052	0.00089	5.00
p,p'-DDD	0.00040	0.00060	0.00137	0.00276	0.00072	0.00276	0.00035#	0.00035#	0.00010	0.00015	NR
p,p'-DDE	0.00350	0.00530	0.00419	0.00943	0.00299	0.00943	0.00079#	0.00079#	0.00067	0.00081	5.00
p,p'-DDT	0.00040	0.00060	0.00056	0.00080	0.00125	0.00531	ND	ND	0.00277	0.00531	5.00
POLYCHLORINATED BIPHENYLS											
TOTAL PCBs (AROCHLOR)	0.04284	0.06245	0.04052	0.07987	0.03371	0.07987	0.01352	0.01414	0.01437	0.01845	NR

NOTES:

ALL VALUES ARE REPORTED IN MG/KG
ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NR: VALUE WAS NOT REPORTED BY THE FOOD AND DRUG ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
+ : VALUES REPORTED IN THIS COLUMN WERE DERRIVED FROM
ACTION LEVELS FOR POISONOUS OR DELETERIOUS SUBSTANCES IN HUMAN FOOD AND ANIMAL FEED,
PUBLISHED BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH SERVICE, FOOD AND DRUG ADMINISTRATION, (617-023/68013). 1992
* : VALUE ESTABLISHED FOR METHYL MERCURY
# : VALUE REPRESENTS A SINGLE SAMPLE.
FLOUNDER SAMPLES WERE NOT COLLECTED FROM THE GREAT BAY ESTUARY.

TABLE 5-63
COMPARISON OF CHEMICAL CONCENTRATIONS IN SEDIMENT SAMPLES FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM YORK HARBOR		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
INORGANICS (MG/KG)										
ALUMINUM	32,635.0000	48,800.0000	37,476.4706	77,900.0000	18,700.0000	20,700.0000	33,647.6190	77,900.0000	28,050.0000	31,700.0000
ARSENIC	10.9700	17.8000	15.8706	28.7000	0.7350	1.2000	12.2976	28.7000	6.0500	13.0000
CADMIUM	0.5333	2.0000	0.7535	1.1000	ND	ND	0.5794	2.0000	0.2000	0.2700
CHROMIUM	88.1800	151.0000	150.0471	211.0000	27.8500	34.0000	109.0119	211.0000	58.2500	99.8000
COPPER	47.1150	105.0000	49.4656	92.4000	1.2950	1.6000	43.2651	105.0000	8.0300	22.4000
IRON	23,610.0000	50,300.0000	29,311.7647	40,000.0000	7,350.0000	9,250.0000	24,632.3810	50,300.0000	14,152.5000	22,800.0000
LEAD	70.7900	124.0000	65.7176	104.0000	19.9000	25.2000	63.3348	124.0000	27.2900	61.9000
MANGANESE	308.7500	421.0000	330.2353	542.0000	104.3000	135.0000	305.1905	542.0000	209.5000	306.0000
MERCURY	0.2142	0.6700	0.2550	0.6700	ND	ND	0.2250	0.6700	ND	ND
NICKEL	28.0526	91.2000	32.2235	44.5000	9.3000	11.1000	27.9049	91.2000	13.7250	21.7000
SILVER	0.4610	0.7400	0.7982	1.3000	ND	ND	0.5926	1.3000	0.4083	0.8900
ZINC	139.2550	530.0000	135.5765	206.0000	19.5000	21.7000	126.4357	530.0000	49.5000	82.0000
PESTICIDES (MG/KG)										
ALDRIN	0.00280	0.02240	0.00063	0.00180	0.00068	0.00072	0.00168	0.02240	0.00035	0.00068
ALPHA-CHLORDANE	0.00068	0.00292	0.00072	0.00237	ND	ND	0.00069	0.00292	0.00062	0.00098
HEPTACHLOR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HEPTACHLOR EPOXIDE	ND	ND	0.00035	0.00090	ND	ND	ND	ND	ND	ND
HEXACHLOROBENZENE	0.00033	0.00086	0.00112	0.00720	ND	ND	0.00060	0.00720	ND	ND
LINDANE (GAMMA-BHC)	0.00046	0.00106	0.00038	0.00079	ND	ND	0.00041	0.00106	ND	ND
MIREX	0.00039	0.00120	0.00057	0.00170	ND	ND	0.00045	0.00170	ND	ND
TRANS-NONACHLOR	0.00034	0.00148	0.00052	0.00123	ND	ND	0.00039	0.00148	ND	ND
o,p'-DDD	0.00080	0.00372	0.00184	0.00290	ND	ND	0.00116	0.00372	0.00055	0.00082
o,p'-DDE	0.00058	0.00223	0.00114	0.00220	ND	ND	0.00075	0.00223	0.00022	0.00031
o,p'-DDT	0.00114	0.00950	0.00117	0.00420	ND	ND	0.00104	0.00950	ND	ND
p,p'-DDD	0.00303	0.01908	0.00726	0.01600	ND	ND	0.00439	0.01908	0.00126	0.00349
p,p'-DDE	0.00186	0.00539	0.00345	0.00640	ND	ND	0.00232	0.00640	0.00074	0.00219
p,p'-DDT	0.01876	0.11956	0.00517	0.01411	0.00598	0.00691	0.01265	0.11956	0.00706	0.01179

NOTES:

ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NO SEDIMENT SAMPLES WERE COLLECTED FROM THE GREAT BAY ESTUARY

TABLE 5-63
COMPARISON OF CHEMICAL CONCENTRATIONS IN SEDIMENT SAMPLES FOR ALL DATA SUBGROUPS
PORTSMOUTH NAVAL SHIPYARD

	SAMPLES COLLECTED FROM AROUND SEAVEY ISLAND		SAMPLES COLLECTED FROM CLARK'S ISLAND EMBAYMENT		SAMPLES COLLECTED FROM YORK HARBOR		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA		SAMPLES COLLECTED FROM THE LOWER PISCATAQUA NOT INCLUDING SEAVEY ISLAND AND CLARK'S ISLAND EMBAYMENT	
ANALYTE	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
POLYAROMATIC HYDROCARBONS										
ANTHRACENE	0.32050	1.90000	0.09633	0.19000	0.01500	0.01700	0.24125	1.90000	0.19420	0.40000
BENZO(A)ANTHRACENE	0.61083	3.60000	0.28100	0.45000	0.04450	0.06500	0.48149	3.60000	0.35460	0.68000
BENZO(A)PYRENE	0.56125	2.20000	0.33133	0.57000	0.05550	0.08400	0.48184	2.30000	0.37600	0.70000
BENZO(E)PYRENE	0.40750	1.50000	0.25667	0.42000	0.03900	0.06000	0.35043	1.50000	0.24220	0.48000
BENZO(G,H,I)PERYLENE	0.20996	0.55000	0.17167	0.38000	0.02450	0.04500	0.19474	0.66000	0.14460	0.29000
CHRYSENE	0.60875	3.20000	0.30200	0.52000	0.05050	0.07600	0.48643	3.20000	0.33700	0.63000
DIBENZO(A,H)ANTHRACENE	0.06275	0.24000	0.04253	0.08400	ND	ND	0.05709	0.24000	0.05670	0.12000
FLOURANTHENE	1.58750	14.00000	0.58067	1.00000	0.11200	0.15000	1.14012	14.00000	0.66120	1.20000
FLOURENE	0.09452	0.67500	0.03157	0.06900	0.00550	0.00600	0.07658	1.10000	0.03820	0.08200
INDENO(1,2,3-CD)PYRENE	0.22692	0.69000	0.17633	0.34000	0.03150	0.05700	0.21539	0.95000	0.18460	0.38000
PERYLENE	0.18458	0.86000	0.11553	0.17000	0.01400	0.02400	0.15622	0.86000	0.10280	0.20000
PHENANTHRENE	0.84479	6.20000	0.29700	0.53000	0.06450	0.07400	0.62655	6.20000	0.34620	0.64000
PYRENE	1.30979	10.00000	0.56033	0.94000	0.09450	0.13000	0.97780	10.00000	0.60440	1.10000
POLYCHLORINATED BIPHENYLS (MG/										
TOTAL PCBs (AROCHLOR)	0.05965	0.34770	0.08164	0.19040	0.00810	0.01030	0.06702	0.34770	0.05452	0.13360

NOTES:

ND: ANALYTE WAS NOT DETECTED
NA: ANALYTE WAS NOT ANALYZED
NO SEDIMENT SAMPLES WERE COLLECTED FROM THE GREAT BAY ESTUARY

TABLE 5-64

IEUBK LEAD MODEL OUTPUT: MUSSELS AVERAGE INGESTION RATE

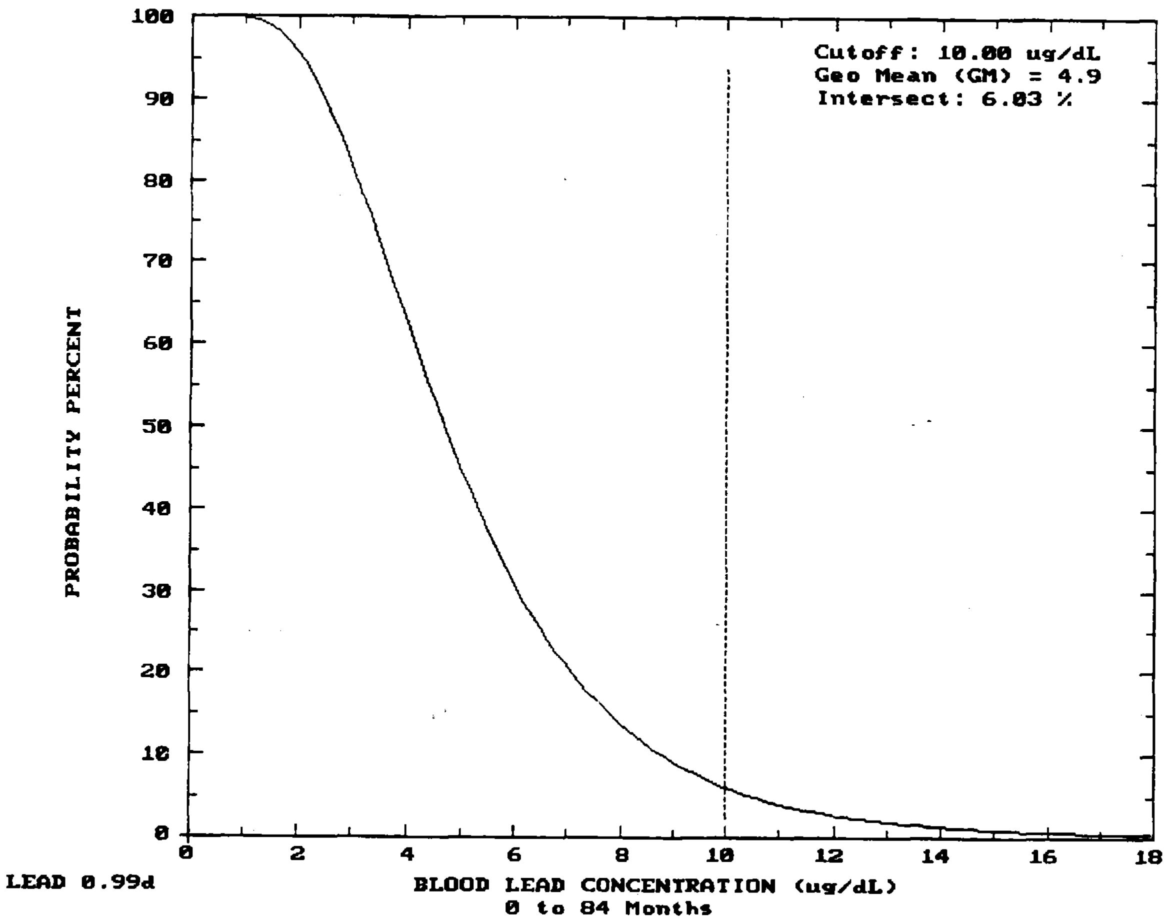


TABLE 5-65

IEUBK LEAD MODEL OUTPUT: MUSSELS WORST CASE INGESTION RATE

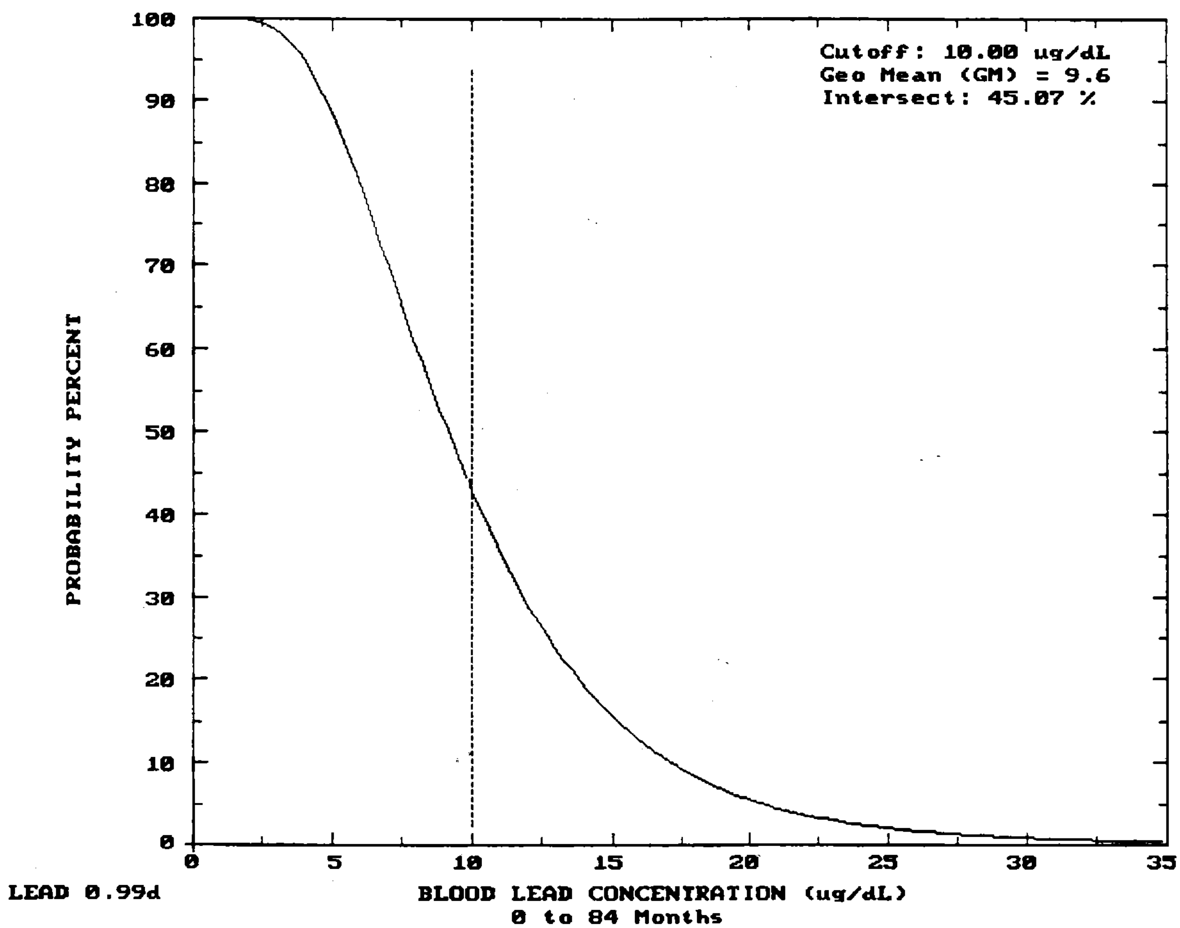


TABLE 5-66

IEUBK LEAD MODEL OUTPUT:
LOBSTER TAIL, WHOLE LOBSTER AND FLOUNDER
WORST CASE INGESTION RATE

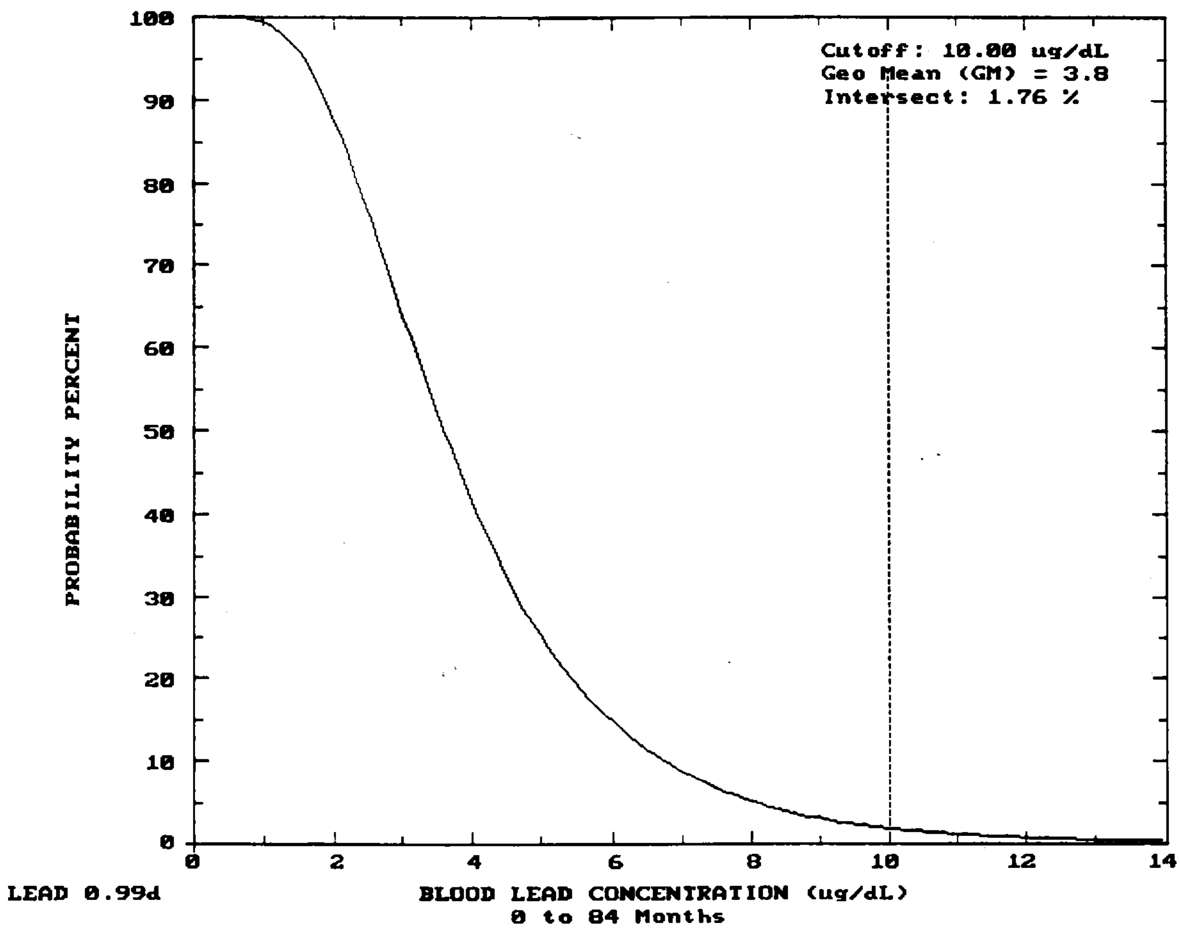


TABLE 5-67

IEUBK LEAD MODEL OUTPUT: LOBSTER TAIL, WHOLE LOBSTER AND MUSSELS AVERAGE EXPOSURE SCENARIO

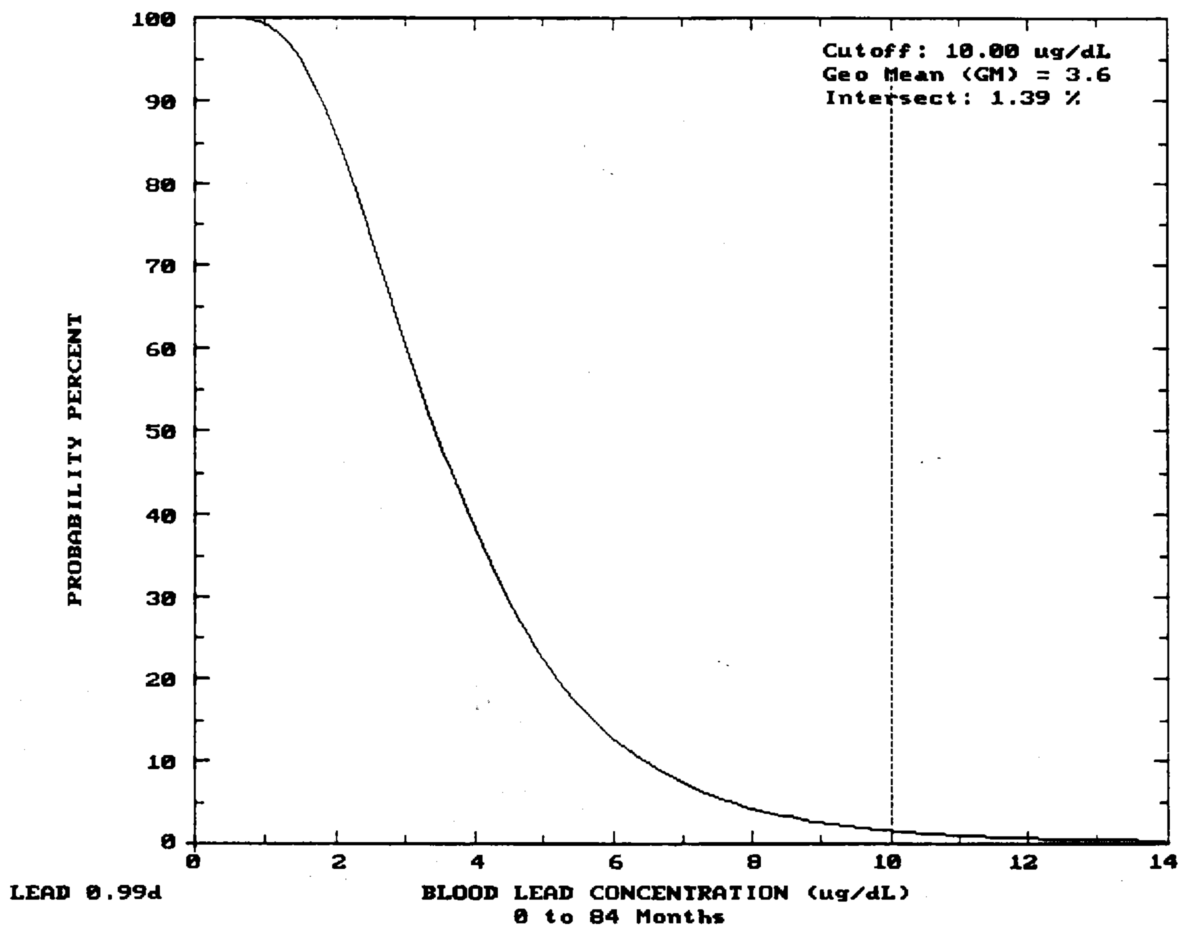


TABLE 5-68

IEUBK LEAD MODEL OUTPUT: WEIGHTED AVERAGE (MUSSELS, LOBSTER TAIL, WHOLE LOBSTER AND FLOUNDER) AVERAGE EXPOSURE SCENARIO

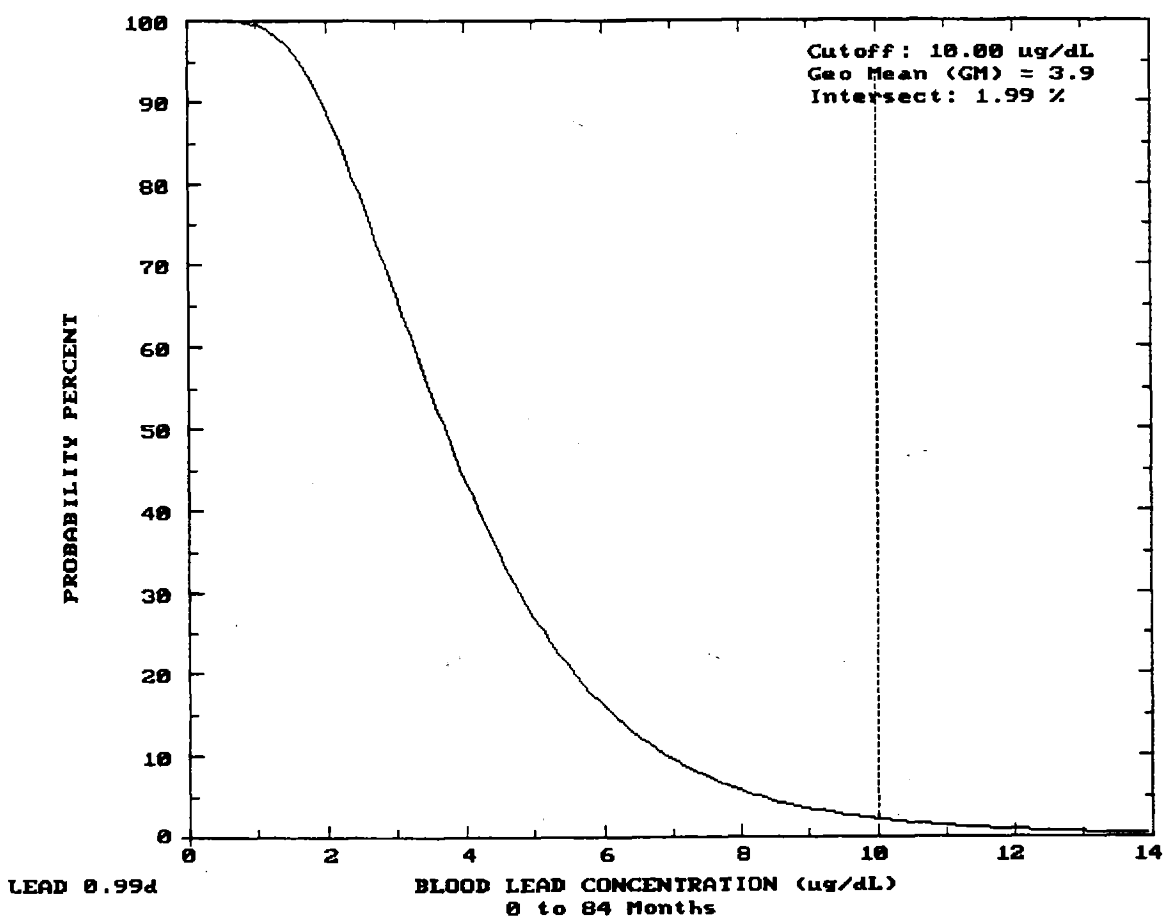
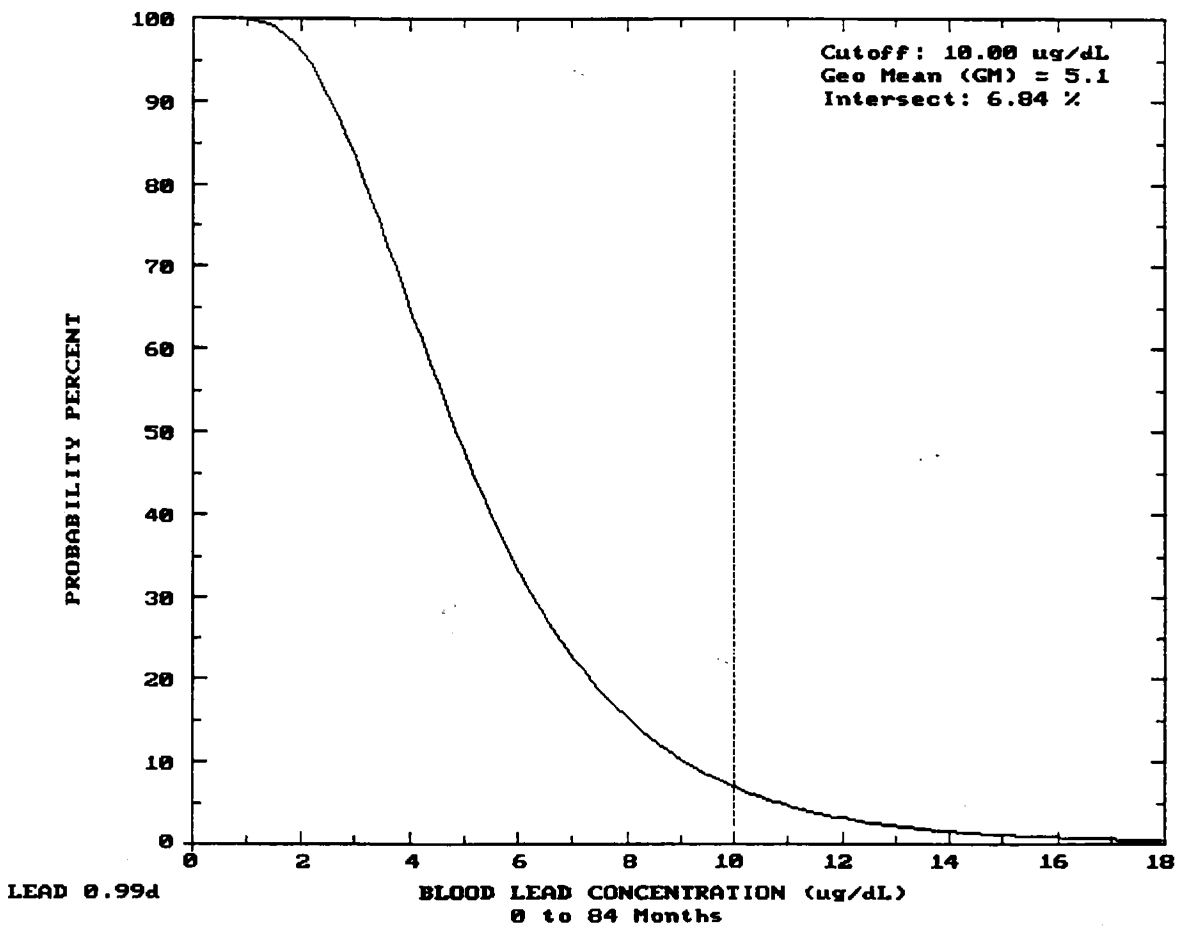


TABLE 5-69

IEUBK LEAD MODEL OUTPUT: WEIGHTED AVERAGE (MUSSELS, LOBSTER TAIL, WHOLE LOBSTER AND FLOUNDER) WORST CASE EXPOSURE SCENARIO



Technical Memorandum
Summary of Fish and Shellfish Data used to Support the
Conclusions for Human Health Risks for Seafood Ingestion for Operable Unit 4
Portsmouth Naval Shipyard, Kittery, Maine

This memorandum presents a brief summary of the fish/shellfish data used to support the conclusions of for human health risks for seafood ingestion for Operable Unit (OU) 4 for Portsmouth Naval Shipyard (PNS), as requested by United States Environmental Protection Agency (USEPA). The following documents were used for the evaluation of human health risks for OU4:

- Final Human Health Risk Assessment Report for Off-Shore Media, Portsmouth Naval Shipyard, Kittery, Maine. Addendum To: Final Public Health and Environmental Risk Evaluation Part -A: Human Health Risk Assessment Report, Portsmouth Naval Shipyard, Kittery, Maine (McLaren/Hart, May 1994).
- Phase I/Phase II Offshore Data Comparative Analysis Report, Portsmouth Naval Shipyard, Kittery, Maine (Tetra Tech, October 1998).
- Public Health Assessment for Portsmouth Naval Shipyard, Kittery, Maine (ATSDR, November, 2007).

Final Human Health Risk Assessment Report

This document presents a summary of the human health risk assessment (HHRA)that was conducted using surface water, sediment, and tissue (lobster, mussel, and flounder) samples collected at locations adjacent to Portsmouth Naval Shipyard (PNS), along with reference locations. Only Phase I data that were collected as part of the Estuarine Ecological Risk Assessment (EERA) (NCCOSC, 2000) were included in the HHRA, because the Phase II data were not available when the HHRA was conducted. The HHRA evaluated risks from both recreational and subsistence fishing, and considered the following various data sets:

- Lower Piscataqua River: This was the primary data set for the HHRA conclusions. Most of the samples were from around Seavey Island and Clark's Island Embayment, but a few were from background locations.
- Lower Piscataqua River Excluding Seavey Island and Clark's Island Embayment: This data set was used to determine the condition of off-site media, with little impact from PNS. This group was considered the background data set.
- Seavey Island: This data set was evaluated to see impacts from Seavey Island.
- Clark's Island Embayment: This data set was evaluated to see impacts from Seavey Island which may have accumulated in the embayment.
- York Harbor: This data was evaluated to determine ecological impacts in a nearby estuarine system with similar ecological characteristics. This group was considered a reference data set.
- Great Bay estuary (mussel only): These data were evaluated to determine whether there were potential upstream contaminant sources.

The following summarized the tables that are presented in the HHRA report:

- Tables 3-3 through 3-37 present the analytical results (frequency of detection, minimum, maximum, and average concentrations, etc.) for each tissue data set.
- Tables 5A, 5-1 through 5-36 present the potential risks calculated for consumption of tissue, for both exposure scenarios (recreational and subsistence), and for each of the data sets. The

tables present the cancer risks and non-cancer hazard quotients (HQ) for each chemical detected in the samples.

- Table 5-54 presents a summary of the chemicals that exceed risk goals of >1E-6 cancer risk and >1 HQ from consumption of tissue samples using the Lower Piscataqua River sample set. The chemicals exceeding the risk goals based on average concentrations and the recreational scenario are shown in Table 1 of this memorandum. Table 1 also presents the cancer risks and HQs for the background data set (Lower Piscataqua River Excluding Seavey Island and Clark's Island Embayment). [Note: The York Harbor cancer risks and HQs were presented as the background values for the whole lobster data set because risks to this receptor group were not calculated for the Lower Piscataqua River excluding Seavey Island and Clark's Island Embayment data set. The York Harbor samples were not analyzed for metals or PAHs, though, because of inadequate sample volume].
- Table 5-55 presents a summary of the chemicals that exceed the risk goals (>1E-6 cancer risk and >1 HQ) from consumption of tissue samples using the other data sets.
- Tables 5-60, 5-61, and 5-62 presents a comparison of the tissue concentrations in lobster tail, mussel, and flounder samples, respectively, across all the data sets.

In summary, average concentrations of a few chemicals in the tissue samples resulted in cancer risks > 1E-6 and HQs greater than 1.0 for recreational human receptors. However, the chemicals listed in Table 1 were generally detected at similar concentrations in the site samples and the background samples. The chemical concentrations between the different tissue data sets are presented on Tables 5-60 through 5-62 of the HHRA report and are discussed in more detail on pages 6-16 of the same report. Also, the text of the report (page 6-16) notes that the majority of arsenic in fish/shellfish is organic arsenic, which is the non-toxic form of arsenic. Because typically less than 10 percent of arsenic in fish/shellfish is inorganic arsenic, risks from arsenic in the HHRA report are greatly overestimated.

Phase I/Phase II Offshore Data Comparative Analysis Report

The Comparative Analysis report was prepared to determine whether the 1994 HHRA, which only used the Phase I data, needed to be updated to include the Phase II data. This was done by comparing the Phase I and Phase II data sets, and determining whether risks would differ significantly if both data sets were used. The comparison was done using data from the following media: lobster tail, lobster hepatopancreas, whole lobster, mussels, and flounder fillets. Risk ratios were calculated for the chemicals that increased in concentrations (either mean or maximum values) from Phase I to Phase II. The following is a summary of the evaluation:

- The Phase I and/or II data are presented on Tables 2-1 through 2-18.
  - Although the concentrations of most chemicals were lower in the Phase II samples, some chemicals did have greater concentrations in the Phase II samples. Also, some chemicals were not analyzed for in the Phase I samples but were detected in the Phase II samples (in particular, methyl mercury).
  - In general, mussels had the most chemicals with greater concentrations in the Phase II samples.
- Table 3-3 presents a summary of the risks using the Phase II data (Appendix C presents the risk calculations). Increases in Phase II concentrations resulted in the identification of:
  - The Phase I/Phase II Offshore Data Comparative Analysis Report concluded that a human health risk assessment using a combined Phase I and Phase II data set was not recommended.

- Three additional potential chemicals of concern (COPCs) (manganese, methyl mercury, and dibenzo(a,h)anthracene) and one additional major risk driver (methyl mercury).
  - Manganese was identified as a COPC in mussels because its maximum detected concentration resulted in an HQ that was greater than 1.0. However, the HQ based on the mean concentration and recreational exposure was 0.067.
  - Dibenzo(a,h)anthracene was considered a COPC in mussels because the cancer risk based on the mean concentration and recreational exposure was 4E-6.
  - Methyl mercury was a COPC and risk driver in lobster tail and whole lobster
    - Mean methyl mercury concentrations in juvenile lobster tail and whole juvenile lobster were 0.46 mg/kg and 0.42 mg/kg, respectively.
    - Methyl mercury concentrations in adult lobster (tail and whole) from the Lower Piscataqua River were lower than concentrations detected in adult lobster from the reference station (Isle of Shoals). Methyl mercury was not analyzed for in juvenile lobster from the Isle of Shoals. Because juvenile lobster are not generally consumed by humans and the adult lobster concentrations were less than acceptable risk levels (and reference concentrations), methyl mercury is not a concern at PNS from a human health perspective.

Public Health Assessment

The Agency for Toxic Substances and Disease Registry (ATSDR) conducted a public health assessment (PHA) at PNS to identify populations that may have been or could be exposed to hazardous substances from PNS and determine the public health implications of those exposures (ATSDR, 2007). ATSDR identified three exposure situations that required a more in-depth evaluation. Table 1 in the PHA presents the potential exposure pathways in more detail. One of these situations included the potential for people to consume fish and shellfish from the estuary of the Lower Piscataqua River surrounding PNS. Table 1 in the PHA presents the potential exposure pathways in more detail.

ATSDR evaluated the data from the various studies in which flounder, lobster, and mussel samples were collected to assess trends in contaminant concentrations in seafood of the Lower Piscataqua River. Tables 3 through 6 present the data that were evaluated from these studies, which included:

- **PNS Phase I and Phase II Data:** This is the same data discussed above in the HHRA and Phase I/Phase II Offshore Data Comparative Analysis Report.

- **Gulfwatch:** The Gulfwatch program is conducted by the Gulf of Maine Council on the Marine Environment and consists of monitoring contaminants in blue mussels along the News Hampshire and Maine coast since 1993. One of the sample locations includes Clark Island, at PNS. Samples evaluated for the PHA were collected from 1993 through 2000.

- **Navy Interim Offshore Monitoring Program:** As part of this program, the Navy collected blue mussel samples through seven sampling rounds from 14 monitoring stations around PNS and 4 reference stations in the Great Bay Estuary. Samples evaluated for the PHA were collected from 1999 through 2003.

ATSDR made the following conclusions based on their evaluation:

- Consumption of flounder (and similar fish) and lobster meat from the Lower Piscataqua River near PNS is not likely to result in adverse health effects in adults and children. This was based on calculations which showed that for both an adult and a child, the doses estimated for exposure to contaminants, including mercury and PCBs, were lower than those contaminants' screening values (ATSDR minimal risk levels or USEPA reference doses), and below levels associated with adverse health effects.

- Estimated exposure doses using the maximum levels for adult lobster tomalley and mussels showed levels above some comparison values. However, the mean mercury concentration did not exceed the FDA action level and the mean value was similar to the mean concentration of mercury found in the reference samples. This indicated that mercury concentrations in mussels found within the river, are on average, less than the FDA action level.
- Fish and shellfish data showed that levels of chemical contaminants near PNS were similar to other areas of the Piscataqua River.

Overall Summary

The three documents discussed above provide the information needed to support the conclusions of the HHRA for Portsmouth Naval Shipyard (PNS). Based on a review of these documents, it was conducted that risks to humans from consuming fish and shellfish from the Piscataqua River near PNS are within acceptable risk levels and/or are less than background concentrations.

References

ATSDR (Agency for Toxic Substances and Disease Registry), November 2007. Public Health Assessment for Portsmouth Naval Shipyard, Kittery, Maine, EPA Facility ID: ME7170022019. U.S. Department of Health and Human Services Public Health Service, Agency for Toxic Substances and Disease Registry.

McLaren/Hart, March 1994. Public Health and Environmental Risk Evaluation Part A: Human Health Risk Assessment for Portsmouth Naval Shipyard, Kittery, Maine. McLaren/Hart Engineering Corporation, Albany, New York.

NCCOSC (Naval Command, Control, and Ocean Surveillance Center), May 2000. Final Estuarine Ecological Risk Assessment for Portsmouth Naval Shipyard, Kittery, Maine. NCCOSC, Narragansett, Rhode Island.

Tetra Tech, October 1998. Phase I/Phase II Offshore Data Comparative Analysis Report for Portsmouth Naval Shipyard, Kittery, Maine. Tetra Tech NUS, Inc., King of Prussia, Pennsylvania.

Table 1

Chemicals Exceeding Risk Goals for Tissue Samples Collected in the Lower Piscataqua River - Recreational Exposure
Portsmouth Navay Shipyard, Kittery, Maine

	Lobster Tail				Whole Lobster				Mussels				Flounder			
	Lower Piscataqua		Background[1]		Lower Piscataqua		Background[2]		Lower Piscataqua		Background[1]		Lower Piscataqua		Background[1]	
Chemical	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer	Cancer	Non-Cancer
Arsenic[3]	2E-03	6.6	7E-04	3.2	2E-03	7.6	NZ[4]	NZ[4]	5E-04	2.1	5E-04	2.3	8E-04	8.8	7E-04	3.28
Aldrin	---	---	2E-06	---	1E-06	---	---	---	1E-06	---	5E-06	---	1E-06	---	2E-06	---
4,4'-DDE	---	---	---	---	2E-06	---	---	---	---	---	---	---	---	---	---	---
Benzo(a)anthracene	7E-05	---	2E-04	---	7E-05	---	NZ[4]	NZ[4]	4E-06	---	6E-06	---	---	---	---	---
Benzo(a)pyrene	7E-05	---	2E-04	---	8E-05	---	NZ[4]	NZ[4]	2E-06	---	4E-06	---	---	---	---	---
Chrysene	1E-04	---	3E-04	---	1E-04	---	NZ[4]	NZ[4]	8E-06	---	9E-06	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	2E-05	---	4E-05	---	3E-05	---	NZ[4]	NZ[4]	---	---	---	---	---	---	---	---
Total PCBs (Aroclors)	3E-05	---	2E-05	---	3E-04	---	3E-05	---	5E-05	---	4E-05	---	8E-05	---	4E-05	---

1 - Background data set includes Lower Piscataqua River samples excluding Seavey Island and Clark's Island Embayment samples.

2 - Background data set includes York Harbor risks because were not calculated for the Lower Piscataqua River excluding Seavey Island and Clark's Island Embayment data set.

3 - The majority of arsenic in fish and shellfish (>90%) is organic arsenic, which is not toxic, which was not accounted for in the risk calculation. Therefore, arsenic risks are overestimaged.

4 - There was inadequate sample volume to analyze the samples for these parameters.

--- - Cancer risk <1E-6 or HQ<1

NZ - Not Analyzed

Appendix D.2

Table 1-1. The route of exposure and measures of contaminants of concern (COC) concentrations that were conducted for the Estuarine ERA.

Route of Exposure	Measure of COC Concentration
Surface Water	Estuarine surface water Seep water Residues in deployed blue mussel
Sediment	Bulk sediment Acid volatile sulfide - simultaneously extracted metal
Biota	Residues in flounder liver and flesh Residues in lobster hepatopancreas and flesh Residues in native blue mussel Residues in eelgrass leaf and root Residues in fucoid algae Residues in spartina leaves

Table 1-2. The assessment endpoints, receptor species and measures of effect that were made for the Estuarine ERA.

Assessment Endpoint Receptor Species	**Measure**
Vitality of Pelagic Community	
Flounder	Flounder condition
Phytoplankton	Phytoplankton standing crop
Blue mussel	Water toxicity to deployed mussel growth
Sea urchin	Water toxicity to sea urchin gametes and larvae
Vitality of Epibenthic Community	
Lobster	Lobster abundance and condition
Fucoid algae	Fucoid algae abundance
Blue mussel	Mussel abundance and condition
Vitality of Infaunal Benthic Community	
Infaunal benthic community	Species richness, abundance, and evenness
Amphipods	Sediment toxicity to amphipods
Vitality of Eelgrass	
Eelgrass	Eelgrass abundance and growth
Vitality of Salt Marsh Community	
Cord grass/Salt Hay	Cord grass/Salt Hay abundance and growth
Salt marsh community	Distribution of plants and invertebrates
Vitality of Avian Community	
Black Duck	Tissue concentrations in prey species
Canada Goose	Tissue concentrations in prey species
Herring Gull	Tissue concentrations in prey species
Osprey	Tissue concentrations in prey species

Table 1-3. Summary of risk from environmental media (surface water or sediment) for the areas of concern (AOC). The confidence in conclusion from the weight-of-evidence analysis for each exposure route is given and the potential risk drivers that could be linked to one or more SWMU(s) are listed.

AOC	Media	Magnitude of Risk	Confidence In Conclusion	Potential Risk Drivers with link to SWMUs
Clark Cove	surface water	Low	Medium	seeps[1], Chromium, Nickel, Polychlorinated-Biphenyls
	sediment	Low	High	
Sullivan Point	surface water	Low	Medium	seeps[2], Copper, Mercury, Nickel, Phenanthrene
	sediment	Intermediate	High	
DRMO Storage Yard	surface water	Negligible	Medium	Lead
Dry Dock	surface water	Low	Medium	Copper, Mercury, Nickel, Zinc, Polychlorinated-Biphenyls Phenanthrene, Pyrene
	sediment	Intermediate	High	
Back Channel	surface water	Low	Medium	Mercury, Phenanthrene, Fluorene, Anthracene
	sediment	Intermediate	High	
Jamaica Cove	surface water	Low	Medium	seeps[3], Lead
	sediment	Low	High	

[1] Because the seeps were not well characterized and they could be a direct route of release from some of the SWMUs, chemicals that exceeded chronic water quality criteria (WQC) in any of the seep samples were identified as potential risk drivers. Chemicals that exceeded WQC in seep samples from Clark Cove were Copper, Nickel, Mercury, and Zinc.

[2] Chemicals that exceeded WQC in seep samples from Sullivan Point were Copper, Mercury, and Zinc.

[3] Chemicals that exceeded WQC in seep samples from Jamaica Cove were Copper, Nickel, Lead, and Zinc.

Table 4-1. Assessment Endpoints and Receptors of Concern used in the ecological risk assessment for Portsmouth Naval Shipyard.

Assessment Endpoint	Receptor of Concern
Pelagic	Blue mussel (*Mytilus edulis*) Winter flounder (*Pleuronectes americanus*) Sea Urchin gametes (*Arbacia punctulata*) Phytoplankton community
Epibenthic	Blue mussel Lobster (*Homarus americanus*) Fucoid algae (*Ascophyllum nodosum*) Winter flounder
Benthic	Benthic infaunal community Amphipods (*Ampelisca abdita*)
Eelgrass	Eelgrass (*Zostera marina*)
Salt Marsh	Salt marsh community Cord grass (*Spartina alterniflora*) Salt Hay (*Spartina patens*)
Avian	Black duck (*Anas rubripes*) Canada goose (*Branta* canadensis) Herring gull (*Larus argentatus*) Osprey (*Pandion haliaetus*)

Table 4-2. Assessment endpoints and measures of effects.

Assessment Endpoint/Receptor	Measure
Vitality of Pelagic Community	
Flounder	Flounder condition and histology
Phytoplankton	Phytoplankton standing crop (Chlorophyll *a*)
Blue mussel	Water toxicity to deployed mussel physiology
Sea urchin	Water toxicity to sea urchin gametes and larvae
Vitality of Epibenthic Community	
Lobster	Lobster abundance and condition
Fucoid algae	Fucoid algae abundance
Blue mussel	Mussel abundance and condition
Vitality of Infaunal Benthic Community	
Infaunal benthic community	Species richness, abundance, and evenness
Amphipods	Sediment toxicity to amphipods
Vitality of Eelgrass	
Eelgrass	Eelgrass abundance and morphometrics
Vitality of Salt Marsh Community	
Cord grass/Salt Hay	Cord grass/Salt Hay abundance and morphometrics
Salt marsh community	Invertebrate abundance
Vitality of Avian Community	
Avian herbivores and predators	Tissue concentrations in prey species

Table 4-3. Measures of exposure concentrations.

Exposure Point	Exposure Measure
Surface Water	Inorganic COC chemistry COC residues in deployed blue mussel Temperature Salinity Nutrient concentration Current structure Microbial concentration
Sediment	Bulk organic and inorganic COC concentration AVS/SEM chemistry Organic carbon concentration Geotechnical characteristics (grain size, water content) and distribution of sediment Microbial concentration
Biota	COC residues in flounder liver and flesh COC residues in lobster hepatopancreas and flesh COC residues in blue mussel COC residues in eelgrass leaf and root COC residues in fucoid algae COC residues in *Spartina* leaves COC residues in diet of avian receptors

Table 7-1. Scheme used to interpret outcomes of measurement activities.

Type of Measure	Degree of Response	Interpretation	Numerical Value (M_i)
Exposure	≤ reference condition or below conservative benchmark concentration	negligible exposure	0
	> qualitative screening level	low exposure	1
	statistically > reference condition	elevated exposure	2
	> a conservative benchmark concentration	high exposure	3
	> a nonconservative benchmark concentration	adverse exposure	4
Effect	similar to reference condition or below ecologically-relevant threshold	no effect	0
	worse than reference condition, but not statistically different[1]	potential effect	1
	statistically worse than reference or control condition[1]	probable effect	2

[1] The data from the AOC are evaluated to determine if there is a problem relative to the reference area. In some cases lower than reference is desirable (*e.g.* percent cover of other vascular plants in salt marsh lower than reference), while in other cases higher than reference is desirable (*e.g.* fucoid algae biomass higher than reference).

Table 7-2. Interpretation of exposure and effect evidence in determining risk.

	Evidence of Exposure				
Evidence of Effect	NEGLIGIBLE	LOW	ELEVATED	HIGH	ADVERSE
NO	Negligible	Negligible	Low	Low	Intermediate
POTENTIAL	Negligible	Low	Intermediate	Intermediate	High
PROBABLE	Low	Low	Intermediate	High	High

Table 7-3. Values of effect (EF_i) and exposure (EX_i) versus endpoint weights (EW_i). used for constructing scatter plots (A) and example calculation (B).

A. Values of effect (EF_i) and exposure (EX_i) versus endpoint weights (EW_i).

Effects Measures (x)	Exposure Measures (x)	Endpoint Weights (y)
Outcome = (EF_i)	Outcome = (EX_i)	Endpoint Weight = (EW_i)
No = 1	Negligible = 1	Low = 1
Potential = 2	Low = 2	Medium = 2
Probable = 3	Elevated = 3	High = 3
	High = 4	
	Adverse = 5	

B. An example calculation for measures of exposure and effects to the Pelagic Assessment Endpoint in Clark Cove.

Raw Data entered from summary table (Appendix IX.1)

	Effect			Exposure	
name	EF_i	EW_i	name	EX_i	EW_i
Phytoplankton Biomass	1	1	Surface Water	1	2
Deployed Mussel SFG	1	2	Deployed Mussel I	1.1	2
Arbacia Toxicity	3	2	Deployed Mussel II	3	2
			Seep	4	1

Effect Exposure

Plotted Values offset by -.5 in x and y direction

name	EF_i	EW_i	name	EX_i	EW_i
Phytoplankton Biomass	0.5	0.5	Surface Water	0.5	1.5
Deployed Mussel SFG	0.5	1.5	Deployed Mussel I	0.6	1.5
Arbacia Toxicity	2.5	1.5	Deployed Mussel II	2.5	1.5
			Seep	3.5	0.5
Arithmetic Average	1.3571	1.1667		1.43	1.25

Weighted Average Calculations to Determine Centroid Location

	Weighted Effects			Weighted Exposure	
name	EF_i	EF_i *EW_i		EX_i	EX_i *EW_i
Phytoplankton Biomass	0.5	0.25	Surface Water	1.5	0.75
Deployed Mussel SFG	1.5	0.75	Deployed Mussel I	1.5	0.9
Arbacia Toxicity	1.5	3.75	Deployed Mussel II	1.5	3.75
			Seep	0.5	1.75
	ΣEF_i	ΣEF_i *EW_i		ΣEX_i	ΣEX_i *EW_i
sum	3.5	4.75		5	7.15
(ΣEF_i *EW_i)/ΣEW_i sum(effects*ew)/sum(ew)		1.3571	(ΣEX_i *EW_i)/ΣEW_i sum(exp*ew)/sum(ew)		1.43
	effect avg(W_x)	ew avg(y)		exp avg(W_x)	ew avg(y)
Plotted Centroid	1.3571	1.1667		1.43	1.25

Table 7-4. Summary of evidence of risk to assessment endpoints in the Clark Cove area of concern.

Assessment Endpoint	Evidence of Effect [1]	Evidence of Exposure [2]	Magnitude of Risk [3]	Confidence in Conclusions [4]
Pelagic	Potential/M	Low/M	Low	Medium
Epibenthic	No/M	Elevated/M	Low	Medium
Benthic	No/H	Elevated/M	Low	High [5]
Eelgrass	Potential/M [6]	Elevated/M	Intermediate	Medium
Salt Marsh	No/M	Elevated/M	Low.	Medium

[1] Entry obtained from scatter plot of effects measures versus the endpoint weights of the effects measures; Entry = effects measure/endpoint weight.
[2] Entry obtained from scatter plot of exposure measures versus the endpoint weights of the exposure measures. Entry = exposure measure/endpoint weight.
[3] Entry obtained from Table 7-2.
[4] Confidence reflects the average of the endpoint weights for effects and exposure measures (*e.g.* average endpoint weight of columns [1] and [2]), the degree of concurrence among the weights (*e.g.* scatter of weights within columns [1] and [2]), the degree of concurrence between conclusions regarding magnitudes of exposure and effect (*e.g.* the balance between the average endpoint weight and the scatter of weights column [3]), and professional judgment used to qualify conclusions.
[5] High concordance between highly weighted measures.
[6] Eelgrass beds only present at station 3 in Clark Cove

Table 7-5. Summary of evidence of risk to assessment endpoints in the Sullivan Point area of concern.

Assessment Endpoint	Evidence of Effect [1]	Evidence of Exposure [1]	Magnitude of Risk [1]	Confidence in Conclusions [1]
Pelagic	No/M	Low/L	Negligible	Medium [2]
Epibenthic	No/M	Elevated/M	Low	Medium
Benthic	Potential/H	High/M	Intermediate	High [3]
Eelgrass	No/M	Elevated/M	Low	Medium
Salt Marsh	Potential/M	Elevated/M	Intermediate	Medium

[1] See Table 7-4 for description.
[2] Medium confidence due to agreement between negligible estuarine surface-water concentrations and the absence of surface-water toxicity.
[3] High confidence due to the concordance between exposure (bulk-sediment chemistry and predicted pore water toxicity) and effect (sediment toxicity) measures.

Table 7-6. Summary of evidence of risk to assessment endpoints in the DRMO Storage Yard area of concern.

Assessment Endpoint	Evidence of Effect [1]	Evidence of Exposure [1]	Magnitude of Risk [1]	Confidence in Conclusions [1]
Pelagic	No/M	Negligible/M	Negligible	Medium
Epibenthic	No/M	Elevated/M	Low	Medium
Benthic [2]				
Eelgrass [2]				
Salt Marsh [2]				

[1] See Table 7-4 for description.
[2] No sediment, eelgrass, or salt marsh habitat in this area of concern.

Table 7-7. Summary of evidence of risk to assessment endpoints in the Dry Dock area of concern.

Assessment Endpoint	Evidence of Effect [1]	Evidence of Exposure [1]	Magnitude of Risk [1]	Confidence in Conclusions [1]
Pelagic	No/M	Negligible/M	Negligible	Medium
Epibenthic	No/M	Elevated/M	Low	Medium
Benthic	Potential/H	High/M	Intermediate	High [3]
Eelgrass	No/M	Elevated/M	Low	Medium
Salt Marsh [2]				

[1] See Table 7-4 for description.
[2] No salt marsh habitat in this area of concern.
[3] High confidence due to the concordance between exposure (bulk-sediment chemistry and predicted pore water toxicity) and effect (sediment toxicity and low invertebrate density) measures.

Table 7-8. Summary of evidence of risk to assessment endpoints in the Back Channel area of concern.

Assessment Endpoint	Evidence of Effect [1]	Evidence of Exposure [1]	Magnitude of Risk [1]	Confidence in Conclusions [1]
Pelagic	No/M	Negligible/M	Negligible	Medium
Epibenthic	No/M	Elevated/M	Low	Medium
Benthic	Potential/H	High/M	Intermediate	High[2]
Eelgrass	Potential/M	Elevated/M	Intermediate	Medium
Salt Marsh	No/M	High/M	Low	Medium

[1] See Table 7-4 for description.
[2] High confidence due to the concordance between exposure (bulk-sediment chemistry and predicted pore water toxicity) and effect (sediment toxicity) measures.

Table 7-9. Summary of evidence of risk to assessment endpoints in the Jamaica Cove area of concern.

Assessment Endpoint	Evidence of Effect [1]	Evidence of Exposure [1]	Magnitude of Risk [1]	Confidence in Conclusions [1]
Pelagic	No/M	Low/M	Negligible	Medium
Epibenthic	No/M	Elevated/M	Low	Medium
Benthic	No/H	Low/M	Negligible	High[2]
Eelgrass	No/M	Elevated/M	Low	Medium
Salt Marsh	No/M	Elevated/M	Low	Medium

[1] See Table 7-4 for description.
[2] High concordance between highly weighted measures of effect.

Table 7-10. Summary of evidence of risk to assessment endpoints for Portsmouth Harbor focus area.

Assessment Endpoint	Evidence of Effect [1]	Evidence of Exposure [1]	Magnitude of Risk [1]	Confidence in Conclusions [1]
Pelagic	No/M	Elevated/M	Low	Medium
Epibenthic	No/M	Elevated/M	Low	Medium
Benthic [2]				
Eelgrass [2]				
Salt Marsh [2]				
Avian	Not Evaluated	Negligible/M	Not Evaluated [3]	Medium [4]

[1] See Table 7-4 for description.
[2] Benthic, eelgrass, salt marsh endpoints not evaluated for Portsmouth Harbor focus area.
[3] With the lack of effects information, the most conservative estimate of risk is Low.
[4] Pertains to the confidence of exposure measures only.

Table 7-11. Numeric values assigned to the magnitude of risk to assessment endpoint (R_i) and confidence in risk to assessment endpoint conclusion (C_i) and lookup cut-off values for determining magnitude of risk from exposure medium (R_M) and confidence in risk from exposure medium conclusion (C_M).

Magnitude of Risk to Assessment Endpoint (R_i)	Numeric Value[1]	Lookup Cut-Off Value[2]	Magnitude of Risk from Exposure Medium (R_M)	Confidence in Risk to Assessment Endpoint Conclusion (C_i)	Numeric Value[1]	Lookup Cut-Off Value[2]	Confidence in Risk from Exposure Medium Conclusion (C_M)
Negligible	0	< 0.50	Negligible	Low	1	< 1.667	Low
Low	1	< 1.25	Low	Medium	2	< 2.333	Medium
Intermediate	2	< 2.00	Intermediate	High	3	≤ 3.000	High
High	3	≤ 3.00	High				

[1] Numeric Value is used to convert qualitative statement to a quantitative value (e.g. "Negligible" to 0) for use in the weighted average equations for R_M and C_M.

[2] Lookup Cut-Off Value is used to convert the quantitative value derived for R_M and C_M into a qualitative statement (e.g. R_M = 1.6 to "Intermediate").

Table 7-12. Weights (WM_i) used for calculating magnitude of risk from medium and confidence in conclusions.

Assessment Endpoint	Surface Water	Sediment
PELAGIC	2	0
EPIBENTHIC	1	1
BENTHIC	0	2
EELGRASS	1	1
SALTMARSH	1	1

Table 7-13. Characterization of ecological risks associated with environmental media at Portsmouth Naval Shipyard by Area of Concern.

Area of Concern	Environmental Medium	Magnitude of Risk From Medium	Confidence In Conclusions
Clark Cove	Surface Water [1] Sediment [3]	Low [2] Low	Medium High
Sullivan Point	Surface Water Sediment [3]	Low Intermediate	Medium High
DRMO [4]	Surface Water [1]	Negligible	Medium
Dry Docks [5]	Surface Water [1] Sediment [3]	Low Intermediate	Medium High
Back Channel	Surface Water [1] Sediment	Low Intermediate	Medium High
Jamaica Cove	Surface Water [1] Sediment [3]	Low Low	Medium High
Portsmouth Harbor [6]	Surface Water [1] Biota [7]	Low Negligible	Medium Medium

[1] Evidence of bioaccumulation in mussels is probably related to surface water exposure.

[2] Sediment resuspension may be influencing surface water risks.

[3] Evidence of bioaccumulation in juvenile lobsters may be related to sediment exposure.

[4] No sedimentary, eelgrass, or salt marsh habitat at DRMO.

[5] No salt marsh habitat in Dry Dock area of concern.

[6] Only pelagic, epibenthic, and avian assessment endpoints were evaluated for Portsmouth Harbor focus area.

[7] Biota evaluated as dietary exposure to avian receptors.

Table 8-1. Summary of AOCs with Low or Intermediate levels of risk, the confidence in the conclusion, and potential risk drivers that can be linked to one or more SWMU(s).

AOC	Media	Magnitude of Risk	Confidence In Conclusion	Potential Risk Drivers with link to SWMUs
Clark Cove	surface water sediment	Low Low	Medium High	seeps[1],Cr, Ni, tPCB
Sullivan Point	surface water sediment	Low Intermediate	Medium High	seeps[2], Cu, Hg, Ni, PHEN
Dry Dock	surface water sediment	Low Intermediate	Medium High	Cu, Hg, Ni, Zn, tPCB, PHEN, PYRENE
Back Channel	surface water sediment	Low Intermediate	Medium High	Hg, PHEN, FLUOR ANTH
Jamaica Cove	surface water sediment	Low Low	Medium High	seeps[3], Pb

[1] Chemicals exceeding WQC in Clark Cove seep samples were Cu, Ni, Hg, and Zn.

[2] Chemicals exceeding WQC in Sullivan Point seep samples were Cu, Hg, and Zn.

[3] Chemicals exceeding WQC in Jamaica Cove seep samples were Cu, Ni, Pb, and Zn.

Appendix E
Applicable or Relevant and Appropriate Requirements

TABLE E-1

DREDGING CONTAMINATED SEDIMENT WITH OFF-YARD DISPOSAL FOR MS-01, MS-03, MS-04, MS-12 (A and B)
CHEMICAL, LOCATION, AND ACTION-SPECIFIC ARARs
OPERABLE UNIT 4 RECORD OF DECISION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
FEDERAL AND STATE CHEMICAL-SPECIFIC ARARs and TBCs: No ARARs or TBCs				
FEDERAL LOCATION-SPECIFIC ARARs and TBCs				
Coastal Zone	Coastal Zone Management Act [16 United States Code (USC) 1451 et seq.]	Applicable	This act provides for the preservation and protection of coastal zone areas. Federal activities that are in or directly affecting the coastal zone must be consistent, to the maximum extent practicable, with a federally approved state management program.	Dredging of sediment that will take place in the coastal zone will include activities to reduce adverse impacts. Maine Department of Environmental Protection (MEDEP) will review remedial action documents, including work plans, to meet the substantive requirements of this act.
Navigable Waters	Rivers and Harbors Act Section 10 [33 USC 403; 33 Code of Federal Regulations (CFR) 322 and 323]	Applicable	These regulations control unauthorized obstruction or alteration of navigable waters. Activities involving structures or work in or affecting navigable waters, excavation or deposition of materials in navigable waters are regulated under these requirements.	Remedial activities, including dredging and sediment dewatering, will be conducted such that navigable waters will not be obstructed or altered.

TABLE E-1

DREDGING CONTAMINATED SEDIMENT WITH OFF-YARD DISPOSAL FOR MS-01, MS-03, MS-04, MS-12 (A and B) CHEMICAL, LOCATION, AND ACTION-SPECIFIC ARARs OPERABLE UNIT 4 RECORD OF DECISION PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
Wetlands and US Waters	Clean Water Act (CWA) Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230)	Applicable	These regulations outline the requirements for the discharge of dredged or fill material into US waters including wetlands. No activity that adversely affects a wetland is permitted if a practicable alternative that has less effect is available. If there is no other practicable alternative, impacts must be mitigated.	Dredging at MS-01, MS-12A, and MS-12B will not adversely impact wetlands in these offshore areas. Dredging at MS-03/MS-04 will be conducted in a mudflat and the 2003 wetlands functions and values assessment for this area (as part of the OU7/Site 32 Remedial Investigation) will be used to guide mitigative efforts if wetlands could be adversely impacted during remedial activities.
Other Natural Resources	The Endangered Species Act of 1973 (16 USC 1531 et seq.; 50 CFR Part 107 and 402)	Applicable	Provides for consideration of impacts to endangered and threatened species and their critical habitats. Requires federal agencies to ensure that any action carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat. The entire State of Maine is considered a habitat of the federally-listed endangered short-nosed sturgeon. The Gulf of Maine population of Atlantic sturgeon is listed as threatened species.	There are no known endangered, threatened, or protected species or critical habitats within the boundaries of PNS. However, short-nosed and Atlantic sturgeons are present in the Piscataqua River. Remedial activities including dredging and dewatering will be conducted so as to avoid any adverse effect under the act to the short-nosed and Atlantic sturgeon.

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
Other Natural Resources	Fish and Wildlife Coordination Act (16 USC 661 et seq.)	Applicable	This act requires any federal agency proposing to modify a body of water to consult with the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service and appropriate state agencies if alteration of a body of water, including discharge of pollutants into a wetland or construction in a wetland, will occur as a result of off-site remedial activities. Consultation is strongly recommended for onsite actions.	Dredging and dewatering will be conducted to prevent discharge of pollutants to a wetland. The Navy will coordinate with USFWS during the preparation of remedial action documents.
Protection of Wetlands	44 CFR 9	Relevant and Appropriate	Federal Emergency Management Agency (FEMA) regulations that set forth the policy, procedure, and responsibilities to implement and enforce Executive Order 11990, Protection of Wetlands.	Remedial activities at MS-01 and MS-03/MS-04, such as dredging and access for equipment conducted within federal jurisdictional wetlands will be implemented in compliance with these standards.

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
STATE LOCATION-SPECIFIC ARARs and TBCs				
Natural Resources	Maine Natural Resources Protection Act Permit by Rule Standards [38 Maine Revised Statutes Annotated (MRSA) 480 et seq.; 06-096 Code of Maine Rules (CMR) 305 1, 2, and 8]	Applicable	This act regulates activity conducted in, on, or over any protected natural resource or any activity conducted adjacent to and operated in such a way that material or soil may be washed into any freshwater or coastal wetland, great pond, river, stream, or brook.	Dredging and construction near to shoreline for MS-01, MS-03/MS-04, and MS-12A will be conducted so as to avoid washing any soil into the nearby Piscataqua River. Stormwater management and erosion control practices would be used to prevent sediment from entering the river or adjacent wetlands during construction.
Coastal Zone	Maine Coastal Management Policies (38 MRSA 1801 et seq.) (06-096 CMR Chapter 1000)	Applicable	Regulates activities near great ponds, rivers and larger streams, coastal areas, and wetlands. Regulates shoreland activities and development, including (but not limited to) water pollution prevention and control, wildlife habitat protection, and freshwater and coastal wetlands protection. The law is administered at the local government level. Shoreland areas include areas within 250 feet of the normal high-water line of any river or saltwater body and areas within 75 feet of the high-water line of a stream.	Dredging and dewatering that may affect storm water runoff, erosion and sedimentation, and surface water quality will be controlled according to these regulations.

TABLE E-1

DREDGING CONTAMINATED SEDIMENT WITH OFF-YARD DISPOSAL FOR MS-01, MS-03, MS-04, MS-12 (A and B)
CHEMICAL, LOCATION, AND ACTION-SPECIFIC ARARs
OPERABLE UNIT 4 RECORD OF DECISION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
Wetlands	Maine Wetland Protection Rules (06 096 CMR Part 310)	Applicable	Standards are provided for protection of wetlands, as defined in MEDEP Chapter 1000 Guidelines for Municipal Shoreline Zoning Ordinances. Jurisdiction under the rules includes the area adjacent to the wetlands, which is the area within 75 feet of the normal high-water line. Activities that have an unreasonable impact on wetlands are prohibited.	Remedial activities for MS-01, MS-03/MS-04, and MS-12 (A and B) will be conducted to avoid impacts to wetlands and coastal wetlands which include tidal and subtidal lands. No functional assessment or compensation will be required based on the exception in Part 310 (5)(C)(6)(b).
FEDERAL ACTION-SPECIFIC ARARs and TBCs				
Surface Water	CWA (33 USC 1251 et seq.) National Recommended Water Quality Criteria (NRWQC)	Applicable	These criteria are used to establish water quality standards for the protection of aquatic life.	Remedial activities, including dredging and dewatering, will be conducted to reduce adverse impacts to the Piscataqua River. Stormwater management, erosion controls, and management of water discharges will be included in remedial activities, as appropriate.
Water Management	CWA Section 402 National Pollutant Discharge Elimination System (NPDES) (40 CFR 122.41, 122.44, and 122.45)	Applicable	Discharges to surface water must meet the substantive requirements of the NPDES program. These sections describe conditions applicable to all permits, establishing limitations, standards, and other permit conditions, and calculating permit conditions.	These regulations will be applicable to water management during dredging where discharges of treated water to a surface water body may occur. The substantive requirements will be met if any discharges of treated water to surface water bodies are required.

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
Water Management	CWA General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR 403.5 – National Pretreatment Standards)	Applicable	The regulations provide general pretreatment requirements for discharge to publically owned treatment works (POTW).	These regulations will be applicable to water management during dredging where discharges to the sanitary sewer system may occur. The substantive requirements will be met if any discharges to the sanitary sewer are required.
Water Management	NPDES (Storm water Permitting) 40 CFR 122.26	Applicable	Describes storm water discharge requirements from construction activities that disturb more than 1 acre.	Storm water management will be implemented to minimize discharges of contaminants to the Piscataqua River and meet the substantive requirements of a general permit. Less than 1 acre will be disturbed at MS-01, MS-03/MS-04, MS-12A, and MS-12B; however, the combined area may be greater than 1 acre.

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
STATE ACTION-SPECIFIC ARARs and TBCs				
Hazardous Waste	Identification of Hazardous Wastes CMR 06-096 Part 850	Applicable	These standards establish requirements for determining whether wastes are hazardous based on either characteristic or listing.	Wastes generated during remedial activities will be analyzed to determine whether they are Resource Conservation and Recovery Act (RCRA) characteristic hazardous wastes. If determined to be hazardous, then the waste will be managed in accordance with regulatory requirements.
	Standards for Generators of Hazardous Waste 38d MRSA 1301 *et seq*., CMR 06-096 Part 851 (5) and (8))	Applicable	These regulations contain requirements for the generators of hazardous waste.	Waste determined to be hazardous will be managed on site, according to the regulation, until disposal offsite.
Erosion	Erosion and Sedimentation Control (38 MRSA Part 420-C)	Applicable	Erosion control measures must be in place before activities such as filling, displacing, or exposing soil or other earthen materials occur. Prior MEDEP approval is required if the disturbed area is in the direct watershed of a body of water most at risk for erosion or sedimentation.	Erosion and sedimentation controls will be used for dredging and stockpiling dredge material. Applicable plans will be coordinated with MEDEP before implementation.

Medium/Activity	Requirement/Citation	Status	Synopsis	Evaluation/Action To Be Taken
Storm Water Management	Storm Water Management (38 MRSA Part 420-D; 06-096 CMR Part 500)	Applicable	Storm water management measures must be in place before activities such as filling, displacing, or exposing soil or other earthen material occur on land greater than or equal to 1 acre.	Although the individual disturbed areas and areas needed for dewatering are each less than 1 acre, the combined area for MS-01, MS-03/MS-04, MS-12A, and MS-12B may be greater than 1 acre. Applicable plans will be coordinated with MEDEP before implementation.
Air Emissions	Visible Emissions Regulation (38 MRSA 584; 06-096 CMR 101).	Applicable	These regulations establish opacity limits for emissions from several categories of air contaminant sources, including general construction activities.	These regulations will be considered for sediment handling. These standards will be met if any of the activities result in emission of particulate matter and fugitive matter to the atmosphere (e.g., dust generation).
Water Management	Maine Discharge Licenses (38 MRSA 413 *et seq.*) and Waste Discharge Permitting Program [06-096 CMR 523 (Waste Discharge License Conditions) Sections 2, 5, and 6; and 06-096 CMR 528 (Pretreatment Program) Section 6]	Applicable	These standards regulate the discharge of pollutants from point sources to surface POTW.	Water discharged from sediment dewatering will be treated to meet these requirements. The substantive requirements will be met for any discharges of treated water to surface water or a POTW.

Appendix F
Alternative Calculations and Cost Estimates

CLIENT: Portsmouth Naval Shipyard		JOB NUMBER: 112G00932.0000.1101	
SUBJECT: OU-4: MS-01			
BASED ON: OU-4 FS SECTION 4		DRAWING NUMBER:	
BY: TJR Date: 4-2010	CHECKED BY: TNW Date: 7/6/10	APPROVED BY:	DATE:

Alternative MS01-03 - Hydraulic Dredging with Off-Yard Disposal

Capital Cost

Pre-Construction Sampling

Labor, Materials, & Equipment per round (sediment sampling from boat)

Assume 3 days to sample with 3 people (1 to travel, 2 local), plus 1 day of preparations

1 person @ $70.00 per hour for 10 hours per for 4 days =	$2,800
car for 4 days =	$400
air =	$400
report @ $65.00 per hour for 15 hours =	$975
subcontractor (boat & crew) =	$12,600
Misc supplies, equipment, copying, etc. =	$500
	$17,675

Analytical

Collect 10 sediment samples and analyze for PAHs.

type	cost each	number	total
PAHs	$150	10	$1,500
			$1,500
			2 fast turn
			$3,000
20% QA/QC & Data Validation			$600
			$3,600

Site Work

Dredge contaminated sediment, pumping sediment into geotubes on a dewatering pad. Collect one water sample and 3 soil/sediment samples for confirmation testing.

Analytical Costs - per sample

Parameter	Unit Cost
PAHs	$ 150.00
	$ 150.00
	2 fast turn
	$ 300

Assume no treatment of the water is required prior to discharge.

Allow tubes to dewater for 30 days. Mix 5% fly ash by volume to complete dewatering.

sediment volume	1,760 cy
percent water	20%
solid volume	1,408 cy
5% fly ash	70 cy
disposal volume	1,478 cy or
	1,774 tons (at 1.2 tons/cy)

CLIENT: Portsmouth Naval Shipyard		JOB NUMBER: 112G00932.0000.1101
SUBJECT: OU-4: MS-01		
BASED ON: OU-4 FS SECTION 4		DRAWING NUMBER:
BY: TJR Date: 4-2010	CHECKED BY: TMD Date: 7/6/10	APPROVED BY: DATE:

Collect one sediment sample for disposal testing. Assume sediment is nonhazardous for disposal.

Parameter	Unit Cost	
TCLP	$ 850.00	
	$ 850.00	
	2	fast turn
	$ 1,700	

Time to complete work

Mob & Setup	10	days
Hydraulic Dredge	3	days
Geotube Dewatering	30	days
Mix fly ash & load for disposal	5	days
Demob	5	days
	53	days
or	11	Weeks
or	3	Month

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine
OU-4
Alternative MS01-03: Hydraulic Dredging with Off-Yard Disposal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare Work Plans	300	hr			$37.00		$0	$0	$11,100	$0	$11,100
1.2 Construction Completion Report	150	hr			$37.00		$0	$0	$5,550	$0	$5,550
1.3 Pre-Construction Sampling (10 samples)	1	ls	$3,600.00	$8,375.00	$900.00	$8,400.00	$3,600	$8,375	$900	$8,400	$21,275
2 MOBILIZATION AND DEMOBILIZATION											
2.1 Site Support Facilities (trailers, phone, electric, etc.)	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2 Equipment Mobilization/Demobilization	3	ea			$170.00	$522.00	$0	$0	$510	$1,566	$2,076
2.3 Dredge Equipment Mobilization/Demobilization	1	ea	$5,200.00				$5,200	$0	$0	$0	$5,200
3 FIELD SUPPORT											
3.1 Office Trailer	3	mo				$375.00	$0	$0	$0	$1,125	$1,125
3.2 Field Office Equipment, Utilities, & Support	3	mo		$470.00			$0	$1,410	$0	$0	$1,410
3.3 Storage Trailer	3	mo				$99.00	$0	$0	$0	$297	$297
3.4 Utility Connection/Disconnection (phone/electric)	1	ls	$1,250.00				$1,250	$0	$0	$0	$1,250
3.5 Site Superintendent	53	day		$188.00	$384.64		$0	$9,964	$20,386	$0	$30,350
3.6 Site Health & Safety and QA/QC	23	day		$188.00	$307.68		$0	$4,324	$7,077	$0	$11,401
4 DECONTAMINATION											
4.1 Decontamination Services	1	mo		$1,220.00	$2,245.00	$1,550.00	$0	$1,220	$2,245	$1,550	$5,015
4.2 Temporary Equipment Decon Pad	1	ls		$1,500.00	$2,000.00	$300.00	$0	$1,500	$2,000	$300	$3,800
4.3 Decon Water	1,000	gal		$0.20			$0	$200	$0	$0	$200
4.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$781.00	$0	$0	$0	$781	$781
4.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$706.00	$0	$0	$0	$706	$706
4.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
5 SEDIMENT EXCAVATION											
5.1 Bathymetric Survey (pre-removal)	1	ea	$5,000.00				$5,000	$0	$0	$0	$5,000
5.2 Hydraulic Dredging	1,760	cy	$45.00				$79,200	$0	$0	$0	$79,200
5.3 Geotube, 60' by 100'	3	ea		$4,800.00			$0	$14,400	$0	$0	$14,400
5.4 Dewatering Pad	2,900	sy		$6.12	$10.26	$2.97	$0	$17,748	$29,754	$8,613	$56,115
5.5 Turbidity Curtain	1,000	ft		$39.90			$0	$39,900	$0	$0	$39,900
5.6 Turbidity Monitoring Buoy	1	mo				$4,080.00	$0	$0	$0	$4,080	$4,080
5.7 Test Dewatering Fluid	1	ea	$300.00	$50.00	$100.00	$50.00	$300	$50	$100	$50	$500
5.8 Confirmation Sample, Soil/Sediment	3	ea	$300.00	$50.00	$100.00	$50.00	$900	$150	$300	$150	$1,500
5.9 Site Labor, (3 laborers)	39	day			$252.80		$0	$0	$9,859	$0	$9,859
5.10 Bathymetric Survey (post-removal)	1	ea	$5,000.00				$5,000	$0	$0	$0	$5,000
6 DISPOSAL											
6.1 Fly Ash	70	cy		$60.00			$0	$4,200	$0	$0	$4,200
6.2 Loader, 4.5 cy	5	day			$330.80	$854.40	$0	$0	$1,654	$4,272	$5,926
6.3 Excavator, 1.5 cy	5	day			$330.80	$865.80	$0	$0	$1,654	$4,329	$5,983
6.4 Site Labor, (2 laborers)	10	day			$252.80		$0	$0	$2,528	$0	$2,528
6.5 Disposal Sampling, TCLP	1	ea	$1,700.00	$50.00	$100.00	$50.00	$1,700	$50	$100	$50	$1,900
6.6 Transportation & Disposal of Sediment, Subtitle "D"	1,774	ton	$50.00				$88,700	$0	$0	$0	$88,700
Subtotal							$191,800	$104,491	$95,717	$39,769	$431,777
Overhead on Labor Cost @ 30%								$10,449			$10,449
G & A Cost @ 10%							$19,180	$10,449	$9,572	$3,977	$43,178
Tax on Materials and Equipment Cost @ 5%								$5,225		$1,988	$7,213
Total Direct Cost							$210,980	$130,614	$105,288	$45,734	$492,617

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine
OU-4
Alternative MS01-03: Hydraulic Dredging with Off-Yard Disposal
Capital Cost

4/29/2010 2:20 PM

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Indirects on Total Direct Cost @ 25%	(excluding transportation and disposal cost)										$100,742
Profit on Total Direct Cost @ 10%											$49,262
Subtotal											$642,620
Health & Safety Monitoring @ 2%											$12,852
Total Field Cost											$655,472
Contingency on Total Field Costs @ 30%											$196,642
Engineering on Total Field Cost @ 10%											$65,547
TOTAL CAPITAL COST											**$917,661**

CLIENT: **Portsmouth Naval Shipyard**		JOB NUMBER: 112G00932.0000.1101	
SUBJECT: OU-4: MS-03 and MS-04			
BASED ON: OU-4 FS SECTION 5		DRAWING NUMBER:	
BY: TJR Date: 11-09 & 6-12	CHECKED BY: AGM Date: 6/8/12	APPROVED BY:	DATE:

Alternative MS0304-03 - Hydraulic Dredging with Off-Yard Disposal

Capital Cost

Pre-Construction Sampling

Labor, Materials, & Equipment per round (sediment sampling)

Assume 2 days to sample with 2 people (1 to travel, 1 local), plus 1 day of preparations

1 person @ $70.00 per hour for 10 hours per for 3 days =	$2,100
Sub: 1 person @ $40.00 per hour for 8 hours per for 2 days =	$640
car for 2 days =	$200
air =	$400
report @ $65.00 per hour for 15 hours =	$975
Misc supplies, equipment, copying, etc. =	$500
	$4,815

Analytical

Collect sediment samples and analyze for PAHs & copper.

type	cost each	number	total	
PAHs	$150	6	$900	
copper	$20	20	$400	
			$1,300	
			2	fast turn
			$2,600	
20% QA/QC & Data Validation			$520	
			$3,120	

Dredge contaminated sediment, pumping sediment into geotubes on a dewatering pad. Collect one water sample and 3 soil/sediment samples for confirmation testing.

Analytical Costs - Dewatering Fluid

Parameter	Unit Cost	
PAHs	$ 150.00	
Metals	$ 125.00	
	$ 275.00	
	2	fast turn
	$ 550.00	

Assume no treatment of the water is required prior to discharge.

Allow tubes to dewater for 30 days. Mix 5% fly ash by volume to complete dewatering.

sediment volume	1,270	cy
percent water	20%	
solid volume	1,016	cy
5% fly ash	51	cy
disposal volume	1,067	cy or
	1,280	tons (at 1.2 tons/cy)

CLIENT: Portsmouth Naval Shipyard		JOB NUMBER: 112G00932.0000.1101
SUBJECT: OU-4: MS-03 and MS-04		
BASED ON: OU-4 FS SECTION 5		DRAWING NUMBER:
BY: TJR Date: 11-09 & 6-12	CHECKED BY: CJM Date: 6/8/12	APPROVED BY: DATE:

Collect one sediment sample for disposal testing. Assume sediment is nonhazardous for disposal.

Parameter	Unit Cost	
TCLP	$ 850.00	
	$ 850.00	
	2	fast turn
	$ 1,700	

Time to complete work

Mob & Setup	10	days
Hydraulic Dredge	3	days
Geotube Dewatering	30	days
Mix fly ash & load for disposal	5	days
Demob	5	days
	53	days
or	11	Weeks
or	3	Month

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare Work Plans	300	hr			$37.00		$0	$0	$11,100	$0	$11,100
1.2 Construction Completion Report	150	hr			$37.00		$0	$0	$5,550	$0	$5,550
1.3 Pre-Construction Sampling (10 samples)	1	ls	$3,120.00	$1,875.00	$2,740.00	$200.00	$3,120	$1,875	$2,740	$200	$7,935
2 MOBILIZATION AND DEMOBILIZATION											
2.1 Site Support Facilities (trailers, phone, electric, etc.)	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2 Equipment Mobilization/Demobilization	3	ea			$170.00	$522.00	$0	$0	$510	$1,566	$2,076
2.3 Dredge Equipment Mobilization/Demobilization	1	ea	$5,200.00				$5,200	$0	$0	$0	$5,200
3 FIELD SUPPORT											
3.1 Office Trailer	3	mo				$375.00	$0	$0	$0	$1,125	$1,125
3.2 Field Office Equipment, Utilities, & Support	3	mo		$470.00			$0	$1,410	$0	$0	$1,410
3.3 Storage Trailer	3	mo				$99.00	$0	$0	$0	$297	$297
3.4 Utility Connection/Disconnection (phone/electric)	1	ls	$1,250.00				$1,250	$0	$0	$0	$1,250
3.5 Site Superintendent	53	day		$188.00	$384.64		$0	$9,964	$20,386	$0	$30,350
3.6 Site Health & Safety and QA/QC	23	day		$188.00	$307.68		$0	$4,324	$7,077	$0	$11,401
4 DECONTAMINATION											
4.1 Decontamination Services	1	mo		$1,220.00	$2,245.00	$1,550.00	$0	$1,220	$2,245	$1,550	$5,015
4.2 Temporary Equipment Decon Pad	1	ls		$1,500.00	$2,000.00	$300.00	$0	$1,500	$2,000	$300	$3,800
4.3 Decon Water	1,000	gal		$0.20			$0	$200	$0	$0	$200
4.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$781.00	$0	$0	$0	$781	$781
4.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$706.00	$0	$0	$0	$706	$706
4.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
5 SEDIMENT EXCAVATION											
5.1 Bathymetric Survey (pre-removal)	1	ea	$5,000.00				$5,000	$0	$0	$0	$5,000
5.2 Hydraulic Dredging	1,270	cy	$45.00				$57,150	$0	$0	$0	$57,150
5.3 Geotube, 60' by 100'	2	ea		$4,800.00			$0	$9,600	$0	$0	$9,600
5.4 Dewatering Pad	2,000	sy		$6.12	$10.26	$2.97	$0	$12,240	$20,520	$5,940	$38,700
5.5 Turbidity Curtain	1,000	ft		$39.90			$0	$39,900	$0	$0	$39,900
5.6 Turbidity Monitoring Buoy	1	mo				$4,080.00	$0	$0	$0	$4,080	$4,080
5.7 Test Dewatering Fluid	1	ea	$550.00	$50.00	$100.00	$50.00	$550	$50	$100	$50	$750
5.8 Confirmation Sample, Soil/Sediment	3	ea	$550.00	$50.00	$100.00	$50.00	$1,650	$150	$300	$150	$2,250
5.9 Site Labor, (3 laborers, 13 days each)	39	day			$252.80		$0	$0	$9,859	$0	$9,859
5.10 Bathymetric Survey (post-removal)	1	ea	$5,000.00				$5,000	$0	$0	$0	$5,000
6 DISPOSAL											
6.1 Fly Ash	51	cy		$60.00			$0	$3,060	$0	$0	$3,060
6.2 Loader, 4.5 cy	5	day			$330.80	$854.40	$0	$0	$1,654	$4,272	$5,926
6.3 Excavator, 1.5 cy	5	day			$330.80	$865.80	$0	$0	$1,654	$4,329	$5,983
6.4 Site Labor, (2 laborers)	10	day			$252.80		$0	$0	$2,528	$0	$2,528
6.5 Disposal Sampling, TCLP	1	ea	$1,700.00	$50.00	$100.00	$50.00	$1,700	$50	$100	$50	$1,900
6.6 Transportation & Disposal of Sediment, Subtitle "D"	1,280	ton	$50.00				$64,000	$0	$0	$0	$64,000
Subtotal							$145,570	$86,543	$88,323	$28,896	$349,332
Overhead on Labor Cost @ 30%								$8,654			$8,654
G & A Cost @ 10%							$14,557	$8,654	$8,832	$2,890	$34,933
Tax on Materials and Equipment Cost @ 5%								$4,327		$1,445	$5,772
Total Direct Cost							$160,127	$108,179	$97,155	$33,230	$398,691
Indirects on Total Direct Cost @ 25%		(excluding transportation and disposal cost)									$83,435
Profit on Total Direct Cost @ 10%											$39,869
Subtotal											$521,996

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Health & Safety Monitoring @ 2%											$10,440
Total Field Cost											$532,436
Contingency on Total Field Costs @ 30%											$159,731
Engineering on Total Field Cost @ 10%											$53,244
TOTAL CAPITAL COST											**$745,410**

CLIENT: Portsmouth Naval Shipyard		JOB NUMBER: 112G00932.0000.1101
SUBJECT: OU-4: MS-12A		
BASED ON: OU-4 FS SECTION 10		DRAWING NUMBER:
BY: TJR Date: 11-09, 6-10 & 6-12	CHECKED BY: CJM Date: 6/4/12	APPROVED BY: DATE:

Analytical, per round for 30 years
Collect 1 sediment samples and analyze for metals.

type	cost each	number	total
metals	$125	1	$125
PAHs	$150	1	$150
			$275
40% QA/QC & Data Validation			$110
			$385

Sampling report assume $1,500 per round $1,500

5-year review
Site Visit and Report $23,000

Alternative MS12A-04 - Removal and Off-Yard Disposal

Capital Cost

Pre-Construction Survey
Same as Alternative MS12A-03

Site Work
Dredge contaminated sediment from outside building, pumping sediment into geotubes on a dewatering pad. Power wash contaminated sediments from inside building, pumping sediments into geotubes on a dewatering pad. Collect one water sample and 3 soil/sediment samples for confirmation testing.

Analytical Costs - per sample

Parameter	Unit Cost	
PAHs	$ 150.00	
Metals	$ 125.00	
	$ 275.00	
	2	fast turn
	$ 550	

Assume no treatment of the water is required prior to discharge.

Allow tubes to dewater for 30 days. Mix 5% fly ash by volume to complete dewatering.

outside sediment volume	1,585	cy
percent water	20%	
solid volume	1,268	cy
5% fly ash	63	cy
disposal volume	1,331	cy or
	1,598	tons (at 1.2 tons/cy)

CLIENT: Portsmouth Naval Shipyard		JOB NUMBER: 112G00932.0000.1101
SUBJECT: OU-4: MS-12A		
BASED ON: OU-4 FS SECTION 10		DRAWING NUMBER:
BY: TJR Date: 11-09, 6-10 & 6-12	CHECKED BY: MJM Date: 6/4/12	APPROVED BY: DATE:

inside sediment volume	150	cy
percent water	0%	
solid volume	150	cy
5% fly ash	8	cy
disposal volume	158	cy or
	189	tons (at 1.2 tons/cy)
total disposal volume	1,787	tons

Collect one sediment sample for disposal testing. Assume sediment is nonhazardous for disposal.

Parameter	Unit Cost	
TCLP	$ 850.00	
	$ 850.00	
	2	fast turn
	$ 1,700	

Time to complete work

Mob & Setup	5	days
Temporary Wall Installation & Net	3	days
Hydraulic Dredge	5	days
Inside Sediment Removal	5	days
Geotube Dewatering	30	days
Mix fly ash & load for disposal	5	days
Demob	5	days
	58	days
or	12	Weeks
or	3	Month

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine
OU-4
Alternative MS12A-04: Removal and Off-Yard Disposal
Capital Cost

6/4/2012 3:32 PM

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare Work Plans	400	hr			$37.00		$0	$0	$14,800	$0	$14,800
1.2 Construction Completion Report	200	hr			$37.00		$0	$0	$7,400	$0	$7,400
1.3 Pre-Construction Survey (ell grass)	1	ea	$5,000.00				$5,000	$0	$0	$0	$5,000
2 MOBILIZATION AND DEMOBILIZATION											
2.1 Site Support Facilities (trailers, phone, electric, etc.)	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2 Equipment Mobilization/Demobilization	4	ea			$170.00	$522.00	$0	$0	$680	$2,088	$2,768
2.3 Crane Mobilization/Demobilization	35	mile				$64.50	$0	$0	$0	$2,258	$2,258
2.4 Dredge Equipment Mobilization/Demobilization	1	ea	$5,200.00				$5,200	$0	$0	$0	$5,200
3 FIELD SUPPORT											
3.1 Office Trailer	3	mo				$375.00	$0	$0	$0	$1,125	$1,125
3.2 Field Office Equipment, Utilities, & Support	3	mo		$470.00			$0	$1,410	$0	$0	$1,410
3.3 Storage Trailer	3	mo				$99.00	$0	$0	$0	$297	$297
3.4 Utility Connection/Disconnection (phone/electric)	1	ls	$1,250.00				$1,250	$0	$0	$0	$1,250
3.5 Site Superintendent	58	day		$188.00	$384.64		$0	$10,904	$22,309	$0	$33,213
3.6 Site Health & Safety and QA/QC	28	day		$188.00	$307.68		$0	$5,264	$8,615	$0	$13,879
4 DECONTAMINATION											
4.1 Decontamination Services	1	mo		$1,220.00	$2,245.00	$1,550.00	$0	$1,220	$2,245	$1,550	$5,015
4.2 Temporary Equipment Decon Pad	1	ls		$1,500.00	$2,000.00	$300.00	$0	$1,500	$2,000	$300	$3,800
4.3 Decon Water	1,000	gal		$0.20			$0	$200	$0	$0	$200
4.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$781.00	$0	$0	$0	$781	$781
4.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$706.00	$0	$0	$0	$706	$706
4.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
5 TEMPORARY WALL, NET, & SEDIMENT REMOVAL (inside)											
5.1 Temporary Wall (barrier & liner for 1 month)	250	lf		$10.00			$0	$2,500	$0	$0	$2,500
5.2 Install/Remove Temporary Wall, Crane	2	day			$635.00	$2,525.00	$0	$0	$1,270	$5,050	$6,320
5.3 Pressure Washers, 2 each	10	day				$117.00	$0	$0	$0	$1,170	$1,170
5.4 Safety Net	9,000	sf				$0.50	$0	$0	$0	$4,500	$4,500
5.5 Sediment Pumps, 2 each	10	day				$117.00	$0	$0	$0	$1,170	$1,170
5.6 Skid Steer w/ attachments	5	day				$335.60	$0	$0	$0	$1,678	$1,678
5.7 Site Labor, (4 laborers @ 5 days each)	20	day			$252.80		$0	$0	$5,056	$0	$5,056
6 SEDIMENT EXCAVATION											
6.1 Hydraulic Dredging	1,585	cy	$45.00				$71,325	$0	$0	$0	$71,325
6.2 Geotube, 60' by 100'	4	ea		$4,800.00			$0	$19,200	$0	$0	$19,200
6.3 Dewatering Pad	4,000	sy		$6.12	$10.26	$2.97	$0	$24,480	$41,040	$11,880	$77,400
6.4 Turbidity Curtain	500	ft		$39.90			$0	$19,950	$0	$0	$19,950
6.5 Turbidity Monitoring Buoy	1	mo				$4,080.00	$0	$0	$0	$4,080	$4,080
6.6 Test Dewatering Fluid	1	ea	$550.00	$50.00	$100.00	$50.00	$550	$50	$100	$50	$750
6.7 Confirmation Sample, Soil/Sediment	3	ea	$550.00	$50.00	$100.00	$50.00	$1,650	$150	$300	$150	$2,250
6.8 Site Labor, (3 laborers @ 14 days each)	42	day			$252.80		$0	$0	$10,618	$0	$10,618
7 DISPOSAL											
7.1 Fly Ash	71	cy		$60.00			$0	$4,260	$0	$0	$4,260
7.2 Loader, 4.5 cy	5	day			$330.80	$854.40	$0	$0	$1,654	$4,272	$5,926
7.3 Excavator, 1.5 cy	5	day			$330.80	$865.80	$0	$0	$1,654	$4,329	$5,983
7.4 Site Labor, (2 laborers @ 5 days each)	10	day			$252.80		$0	$0	$2,528	$0	$2,528
7.5 Disposal Sampling, TCLP	1	ea	$1,700.00	$50.00	$100.00	$50.00	$1,700	$50	$100	$50	$1,900
7.6 Transportation & Disposal of Sediment, Subtitle "D"	1,787	ton	$50.00				$89,350	$0	$0	$0	$89,350
Subtotal							$176,975	$92,138	$122,369	$50,984	$442,465

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Overhead on Labor Cost @ 30%									$36,711		$36,711
G & A Cost @ 10%							$53,093	$9,214	$12,237	$5,098	$79,642
Tax on Materials and Equipment Cost @ 5%								$4,607		$2,549	$7,156
Total Direct Cost							$230,068	$105,959	$171,316	$58,631	$565,973
Indirects on Total Direct Cost @ 25%		(excluding transportation and disposal cost)									$118,918
Profit on Total Direct Cost @ 10%											$56,597
Subtotal											$741,489
Health & Safety Monitoring @ 2%											$14,830
Total Field Cost											$756,319
Contingency on Total Field Costs @ 40%											$302,528
Engineering on Total Field Cost @ 10%											$75,632
TOTAL CAPITAL COST											**$1,134,478**

CLIENT: Portsmouth Naval Shipyard		JOB NUMBER: 112G00932.0000.1101
SUBJECT: OU-4: MS-12B		
BASED ON: OU-4 FS SECTION 10		DRAWING NUMBER:
BY: TJR Date: 11-09 & 7-10	CHECKED BY: TWD Date: 7/6/10	APPROVED BY: DATE:

Alternative MS12B-03 - Hydraulic Dredging with Off-Yard Disposal

Capital Cost

Pre-Construction Sampling

Labor, Materials, & Equipment per round (sediment sampling from boat)
Assume 3 days to sample with 3 people (1 to travel, 2 local), plus 1 day of preparations

1 person @ $70.00 per hour for 10 hours per for 4 days =	$2,800
car for 4 days =	$400
air =	$400
report @ $65.00 per hour for 15 hours =	$975
subcontractor (boat & crew) =	$12,600
Misc supplies, equipment, copying, etc. =	$500
	$17,675

Analytical

Collect 10 sediment samples and analyze for PAHs.

type	cost each	number	total	
PAHs	$150	10	$1,500	
			$1,500	
			2	fast turn
			$3,000	
20% QA/QC & Data Validation			$600	
			$3,600	

Site Work

Dredge contaminated sediment, pumping sediment into geotubes on a dewatering pad. Collect one water sample and 3 soil/sediment samples for confirmation testing.

Analytical Costs - per sample

Parameter	Unit Cost	
Metals	$ 125.00	
	$ 125.00	
	2	fast turn
	$ 250	

Assume no treatment of the water is required prior to discharge.

Allow tubes to dewater for 30 days. Mix 5% fly ash by volume to complete dewatering.

sediment volume	335 cy
percent water	50%
solid volume	168 cy
5% fly ash	8 cy
disposal volume	176 cy or
	211 tons (at 1.2 tons/cy)

CLIENT: Portsmouth Naval Shipyard		JOB NUMBER: 112G00932.0000.1101
SUBJECT: OU-4: MS-12B		
BASED ON: OU-4 FS SECTION 10		DRAWING NUMBER:
BY: TJR Date: 11-09 & 7-10	CHECKED BY: TWD Date: 7/6/10	APPROVED BY: DATE:

Collect one sediment sample for disposal testing. Assume sediment is nonhazardous for disposal.

Parameter	Unit Cost	
TCLP	$ 850.00	
	$ 850.00	
	2	fast turn
	$ 1,700	

Time to complete work

Mob & Setup	10	days
Hydraulic Dredge	2	days
Geotube Dewatering	30	days
Mix fly ash & load for disposal	2	days
Demob	5	days
	49	days
or	10	Weeks
or	2	Month

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine
OU-4
Alternative MS12B-03: Hydraulic Dredging with Off-Yard Disposal
Capital Cost

7/1/2010 10:10 AM

	Item	Quantity	Unit	Unit Cost				Extended Cost				
				Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1	**PROJECT PLANNING & DOCUMENTS**											
1.1	Prepare Work Plans	300	hr			$37.00		$0	$0	$11,100	$0	$11,100
1.2	Construction Completion Report	150	hr			$37.00		$0	$0	$5,550	$0	$5,550
1.3	Pre-Construction Sampling (10 samples)	1	ls	$3,600.00	$8,375.00	$900.00	$8,400.00	$3,600	$8,375	$900	$8,400	$21,275
2	**MOBILIZATION AND DEMOBILIZATION**											
2.1	Site Support Facilities (trailers, phone, electric, etc.)	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2	Equipment Mobilization/Demobilization	3	ea			$170.00	$522.00	$0	$0	$510	$1,566	$2,076
2.3	Dredge Equipment Mobilization/Demobilization	1	ea	$5,200.00				$5,200	$0	$0	$0	$5,200
3	**FIELD SUPPORT**											
3.1	Office Trailer	2	mo				$375.00	$0	$0	$0	$750	$750
3.2	Field Office Equipment, Utilities, & Support	2	mo		$470.00			$0	$940	$0	$0	$940
3.3	Storage Trailer	2	mo				$99.00	$0	$0	$0	$198	$198
3.4	Utility Connection/Disconnection (phone/electric)	1	ls	$1,250.00				$1,250	$0	$0	$0	$1,250
3.5	Site Superintendent	49	day		$188.00	$384.64		$0	$9,212	$18,847	$0	$28,059
3.6	Site Health & Safety and QA/QC	19	day		$188.00	$307.68		$0	$3,572	$5,846	$0	$9,418
4	**DECONTAMINATION**											
4.1	Decontamination Services	1	mo		$1,220.00	$2,245.00	$1,550.00	$0	$1,220	$2,245	$1,550	$5,015
4.2	Temporary Equipment Decon Pad	1	ls		$1,500.00	$2,000.00	$300.00	$0	$1,500	$2,000	$300	$3,800
4.3	Decon Water	1,000	gal		$0.20			$0	$200	$0	$0	$200
4.4	Decon Water Storage Tank, 6,000 gallon	1	mo				$781.00	$0	$0	$0	$781	$781
4.5	Clean Water Storage Tank, 4,000 gallon	1	mo				$706.00	$0	$0	$0	$706	$706
4.6	Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
5	**SEDIMENT EXCAVATION**											
5.1	Bathymetric Survey (pre-removal)	1	ea	$5,000.00				$5,000	$0	$0	$0	$5,000
5.2	Hydraulic Dredging	335	cy	$45.00				$15,075	$0	$0	$0	$15,075
5.3	Geotube, 45' by 100'	1	ea		$3,840.00			$0	$3,840	$0	$0	$3,840
5.4	Dewatering Pad	580	sy		$6.12	$10.26	$2.97	$0	$3,550	$5,951	$1,723	$11,223
5.5	Turbidity Curtain	500	ft		$39.90			$0	$19,950	$0	$0	$19,950
5.6	Turbidity Monitoring Buoy	1	mo				$4,080.00	$0	$0	$0	$4,080	$4,080
5.7	Test Dewatering Fluid	1	ea	$250.00	$50.00	$100.00	$50.00	$250	$50	$100	$50	$450
5.8	Confirmation Sample, Soil/Sediment	3	ea	$250.00	$50.00	$100.00	$50.00	$750	$150	$300	$150	$1,350
5.9	Site Labor, (3 laborers)	36	day			$252.80		$0	$0	$9,101	$0	$9,101
5.10	Bathymetric Survey (post-removal)	1	ea	$5,000.00				$5,000	$0	$0	$0	$5,000
6	**DISPOSAL**											
6.1	Fly Ash	8	cy		$60.00			$0	$480	$0	$0	$480
6.2	Loader, 4.5 cy	2	day			$330.80	$854.40	$0	$0	$662	$1,709	$2,370
6.3	Excavator, 1.5 cy	2	day			$330.80	$865.80	$0	$0	$662	$1,732	$2,393
6.4	Site Labor, (2 laborers)	4	day			$252.80		$0	$0	$1,011	$0	$1,011
6.5	Disposal Sampling, TCLP	1	ea	$1,700.00	$50.00	$100.00	$50.00	$1,700	$50	$100	$50	$1,900
6.6	Transportation & Disposal of Sediment, Subtitle "D"	211	ton	$50.00				$10,550	$0	$0	$0	$10,550
	Subtotal							$49,325	$54,089	$64,884	$27,244	$195,542
	Overhead on Labor Cost @ 30%								$5,409			$5,409
	G & A Cost @ 10%							$4,933	$5,409	$6,488	$2,724	$19,554
	Tax on Materials and Equipment Cost @ 5%								$2,704		$1,362	$4,067
	Total Direct Cost							$54,258	$67,611	$71,373	$31,331	$224,572
	Indirects on Total Direct Cost @ 25%	(excluding transportation and disposal cost)										$53,268
	Profit on Total Direct Cost @ 10%											$22,457

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Subtotal											$300,297
Health & Safety Monitoring @ 2%											$6,006
Total Field Cost											$306,303
Contingency on Total Field Costs @ 30%											$91,891
Engineering on Total Field Cost @ 10%											$30,630
TOTAL CAPITAL COST											**$428,824**

Appendix G
Memorandum for MS-12A

Tetra Tech

Memorandum

To: Elizabeth Middleton, NAVFAC MIDLANT

From: Deborah Cohen, Tetra Tech

Date: July 18, 2013

Re: Operable Unit 4 Removal of Risk from within Portion of MS-12A at Portsmouth Naval Shipyard, Kittery, Maine

Contract/CTO Number: N62470-08-D-1001/WE13

Introduction. The proposed CERCLA remedial action for Operable Unit 4 (OU4) includes removing contaminated sediments within MS-12A, which extends from the intertidal area of Building 178 to the end of the ramp extending from Building 178. Building 178 is currently undergoing a major renovation project by the Shipyard. To provide sufficient work space outside the building, a cofferdam was placed on the ramp to prevent river water from entering the construction area, and sediment within the working area (including the portion under the cofferdam) was removed as discussed herein. Upon completion of the renovation project, the portion of the ramp between the building and the outer edge of the cofferdam will be restored. Remaining contaminated sediment outside of the cofferdam (to the south) on the ramp outside of Building 178 will be remediated as part of the remedial action for OU4 (MS-12A).

The following provides information to support that no CERCLA action is required for the portion of MS-12A beginning inside the building and extending to the outside toe of the cofferdam.

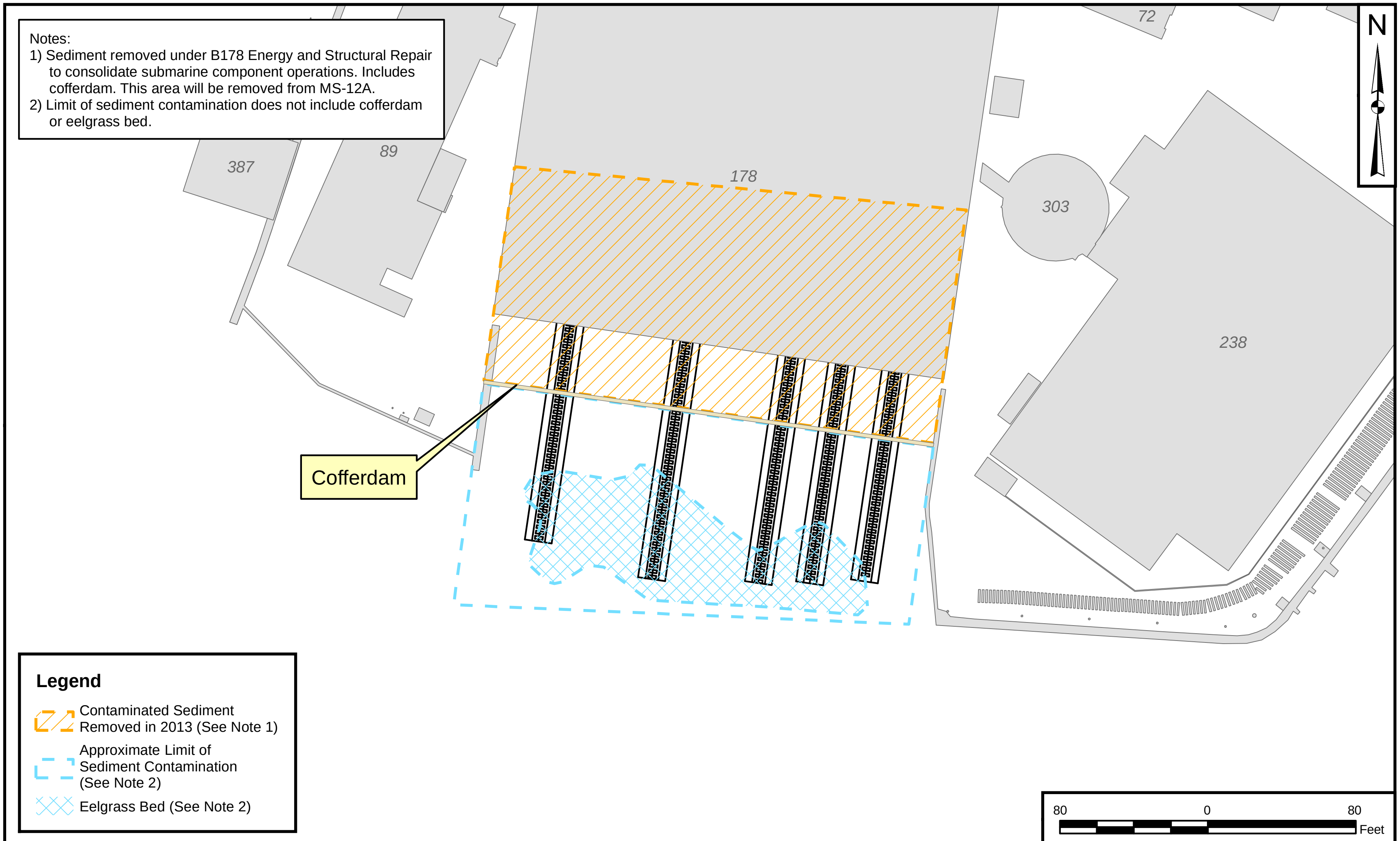
Sediment Removal and Confirmation Activities. As part of the Shipyard construction project, sediment was removed from the intertidal area within Building 178 and from the portion of the ramp outside of Building 178 to the cofferdam, as shown on Figure 1. Sediment was removed until underlying concrete, bedrock, or rock was exposed. Generally no more than 1 foot of material was removed.

A site walk was conducted on January 23, 2013 by Navy personnel, the United States Environmental Protection Agency (USEPA) Remedial Project Manager (RPM), the Maine Department Environmental Protection (MEDEP) RPM, and Tetra Tech staff. The post-sediment removal conditions for the area outside of Building 178 were observed. One foot of sediment and underlying material had been removed. The remaining material was very coarse, and a test pit was dug to 3 feet below ground surface (bgs) to better observe the remaining material. The material consisted of gravel, coarse sand, cobbles, boulders, and trace silt. It was agreed that the material remaining was not suitable habitat and contained very little sediment. Therefore, no additional removal of material or confirmation sampling was required for this area.

A site walk was conducted on March 14, 2013 by Navy personnel, the USEPA and MEDEP RPMs, and Tetra Tech staff to observe the post-sediment removal conditions for the intertidal area within Building 178. Bedrock or rock was found to underlie sediment in the western portion of the intertidal area within Building 178; however, soil consisting of sand and gravel was found to underlie sediment within the eastern portion of the intertidal area within Building 178. Some areas were covered with concrete; however, there appeared to be fewer areas with concrete than previously believed. Based on subsequent discussions, the Navy agreed to conduct confirmation sampling within the intertidal area of Building 178 to determine whether the soil had been adversely impacted by overlying contaminated sediment. Sampling was conducted on April 26, 2013. During the sampling event, the ground surface in the intertidal area was investigated to determine the depth of soil, if present. It was determined that the majority of the intertidal area was covered by concrete slab, cobbles, or rock (blast rock/bedrock); however, soil was 3 inches or greater in depth in some areas. Composite soil samples were collected in these areas and the samples were analyzed for MS-12A chemicals of concern (COCs). The results showed that COC concentrations in soil were acceptable. The results are discussed further in the Memorandum on July 15, 2013.

Conclusion. The remedial action objective for OU4 is to eliminate unacceptable risks to ecological benthic receptors exposed to site-related COCs in suitable sediment habitats. The results of the confirmation site walks and sampling show that current site conditions and restoration activities anticipated for the portion of MS-12A (shown on Figure 1) affected by the renovation project do not pose unacceptable risks to ecological benthic receptors. Therefore, no CERCLA action is required for this portion of MS-12A and it will be removed from MS-12A. The Record of Decision for OU4 will reflect the removal of this portion of MS-12A.

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\MONITORING SITE MAPS\MS-12A_SEDIMENT_REMOVAL_2013.MXD 06/28/13 JEE



DRAWN BY J. ENGLISH	DATE 06/20/13	TETRA TECH	CONTRACT NUMBER 2100	CTO NUMBER WE13
CHECKED BY D. COHEN	DATE 06/28/13	MS-12A SEDIMENT REMOVAL AREA PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY __	DATE __
REVISED BY ___	DATE ___		APPROVED BY __	DATE __
SCALE AS NOTED			FIGURE NO. FIGURE 1	REV 0